PIONEER®

Service Manual

ORDER NO.
ARP-802-0

STEREO CASSETTE TAPE DECK

CT-A7X HEM

CT-A7X(BK) KU, HEM, HB

●For the servicing these models, please refer to the CT-A7 Repair and Adjustments service manual (ARP-450) and CT-A9/CT-A7 Circuit & Mechanism Descriptions(ARP-462) with the exception of this additional service manual.

- CT-A7X is the same as the CT-A7 except for the exterior design. CT-A7X has wooden side panels.
- CT-A7X (BK) is the black version of CT-A7X.

Contrast of Miscellaneous Parts

EXTERIOR COMPONENTS

Key No	Description	Part No.			Remarks
		CT-A7	CT-A7X	CT-A7X (BK)	
1	Bonnet case	RNA-617	RNA-691	RNA-690	
4	Knob (EJECT)	RXB-927	←	RXB-987	
5	Knob (TIMER)	RAC-367	←	RAC-405	
8	Knob (STOP)	RXB-928	←	RXB-988	
9	Knob (PLAY)	RXB-929	←	RXB-989	
10	Knob (REC)	RXB-930	←	RXB-990	
11	Knob (MS, MONITOR)	RAC-370	←	RAC-410	
13	Tape counter assembly	RAW-201	←	RAW-206	
14	Meter screen	RNL-797	←	RNL-856	
15	Front panel assembly	RXX-432	RXX-483	RXX-482	
16	Door frame	RAH-487	←	RAH-529	
17	Door	RNL-761	←	RNL-857	
18	Dressing screw	RBA-085	←	RBA-088	

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TEL: [03] 580-9911

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Key No.	Description	Part No.			Remarks
		CT-A7	CT-A7X	CT-A7X (BK)	
20	Inscription plate	RAH-490	RAH-588	RAH-586	
21	Knob (INPUT L)	RAC-372	←	RAC-411	
22	Knob (INPUT R)	RAC-373	←	RAC-412	
28	Knob (OUTPUT)	RAC-374	←	RAC-413	
29	Knob (DOLBY NR)	RXB-939	←	RXC-012	
30	Knob (B/C)	RXB-937	←	RXC-010	
31	Knob (MPX FILTER)	RXB-938	←	RXC-011	
33	Knob (REW)	RXB-932	←	RXB-992	
34	Knob (FF)	RXB-931	←	RXB-991	
35	Knob (RESET)	RXB-935	←	RXB-995	
36	Knob (TAPE RETURN)	RXB-936	←	RXB-996	
37	Knob (PAUSE)	RXB-933	←	RXB-993	
38	Knob (REC MUTE)	RXB-934	←	RXB-994	
39	Cassette plate assembly	RXX-431	←	RXX-450	Including key no. 40
40	LED	SLF-201C	←	SLF-601C	Tape lighting
42	Knob (POWER)	RAD-213	←	RAD-251	

TAPE TRANSPORT UNIT

Key No.	Description	Part No.			Remarks
		CT-A7	CT-A7X	CT-A7X (BK)	
17	Pocket (L)	RNL-736	←	RNL-849	
25	Pocket (R)	RNL-737	←	RNL-850	

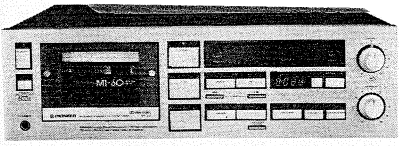
PACKING AND FURNISHED PARTS

Key No.	Description	Part No.			Remarks
		CT-A7	CT-A7X	CT-A7X (BK)	
	Packing case	RHG-688	RHG-791	RHG-782	
	Wooden side panel (L)	....	RHM-011	RHM-011	
	Wooden side panel (R)	....	RHM-012	RHM-012	
	Screw for wooden side panel setting	....	RBA-093	RBA-093	
	Rivet	....	PBM-014	PBM-013	
	Operating instructions				
	(for KU & HB: English)	RRB-224	....	RRB-247	
	(for HEM: English/German/French/ Italian)	RRE-054	RRE-073	RRE-073	

PIONEER

Service Manual

REPAIR & ADJUSTMENTS



ORDER NO.
ARP-450-0

STEREO CASSETTE TAPE DECK

CT-A7

MODEL CT-A7 COMES IN SEVEN VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC120V only	U.S.A. model
KC	AC120V only	Canada model
HEM	AC220V (240V)	European continent model
HB	AC240V (220V)	United Kingdom model
HP	AC240V (220V)	Australia model
D	AC120V, 220V, 240V (switchable)	General export model
D/G	AC120V, 220V, 240V (switchable)	U.S. Military model

- This service manual is applicable to the KU type. For servicing of the other types, please refer to pp. 59~62.
- For the circuit and mechanism descriptions, please refer to the CT-A9 service manual (ARP-462-0).
- Ce manuel d'instruction se refère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
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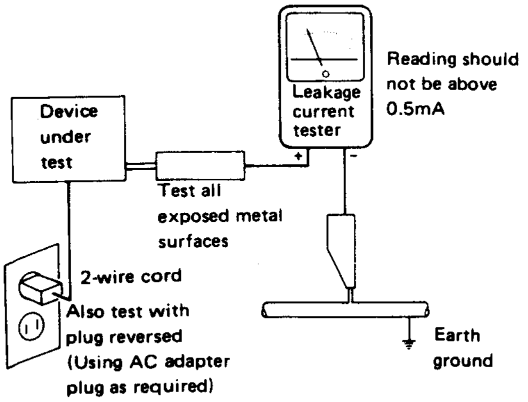
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Device under test
Leakage current tester
Reading should not be above 0.5mA
+
-
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. SPECIFICATIONS

System	4 track, 2-channel stereo
Heads	"Ribbon Sendust" recording/playback combination head x 1, Erasing head x 1
Motor	DC servo capstan motor x 1 DC reel motor x 1
Wow/Flutter	No more than 0.028% (WRMS) No more than ± 0.085% (DIN)
Fast Winding Time	Approx. 80 seconds (C-60 tape)
Frequency Response	
−20 dB recording:	
Normal tape	20 to 20,000 Hz (30 to 19,000 Hz ± 3 dB)
Chrome tape	20 to 20,000 Hz (25 to 19,000 Hz ± 3 dB)
Metal tape	20 to 20,500 Hz (25 to 20,000 Hz ± 3 dB)
0 dB recording:	
Chrome tape	20 to 11,000 Hz
Metal tape	20 to 16,000 Hz
Signal-to-Noise Ratio	
Dolby NR OFF	More than 57 dB
Noise Reduction Effect	
Dolby type B NR ON	More than 10 dB (at 5 kHz)
Dolby type C NR ON	More than 19 dB (at 5 kHz)
Harmonic Distortion	No more than 0.8% (0 dB)
Input (Sensitivity)	
LINE (INPUT)	63 mV (Input impedance 120 kΩ)
Output (Reference level)	
LINE (OUTPUT)	0,63 V (Output impedance 3 kΩ)
Headphone	0,45 mW (Load impedance 8 Ω)

MISCELLANEOUS

Power Requirements	
KU, KC models	AC 120 V, 60 Hz
HEM model	AC 220 V, 50/60 Hz
HB, HP models	AC 240 V, 50/60 Hz
D, D/G models	AC 120/220/240V, 50/60 Hz (switchable)
Power Consumption	
KU, KC models	38 watts
HEM, HB, HP models	35 watts
D, D/G models	28 watts
Dimensions	420 (W) x 130 (H) x 374 (D) mm 16-9/16 (W) x 5-1/8 (H) x 14-12/16 (D) in
Weight (without packaging)	7.9 kg (17 lb 7 oz)

FURNISHED PARTS

Operating instructions	1
Connection cord with pin plug	2

SUBFUNCTIONS

- Four-column digital counter
- Dolby NR system (type B and C)
- Closed loop dual capstan
- One touch MS, one touch tape return
- Auto monitor
- Auto tape selector function
- Auto rec mute
- Recording level warning zone switch
- Auto loading/power eject
- Timer standby function

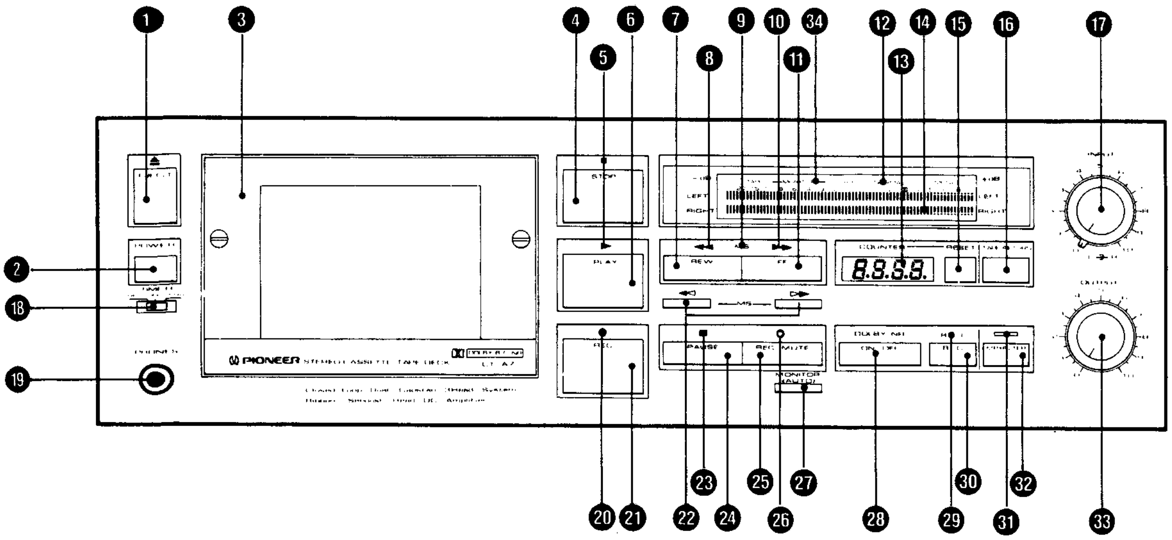
NOTES:

1. Reference Tapes:
   Normal and LH: DIN 45513/BLATT6 or equiv.
   CrO_2 DIN 45513/BLATT7 (CrO_2) or equiv.
2. Reference Recording Level: Meter 0 dB indicating level (160 nwb/m magnetic level = Philips cassette reference level)
3. Reference Signal: 315 Hz
4. Wow and Flutter: • JIS (3 kHz, with acoustic compensation (weighted) rms value); DIN 3,150Hz with acoustic compensation tion (weighted) PEAK value DIN 45507
5. Frequency Response: • Measured at − 20 dB level, DOLBY NR OFF, level deviation is ± 6 dB without indication.
6. Signal-to-Noise Ratio: • Measured at 3rd harmonic distortion 3% level, weighted (DIN 45513/BLATT7)
7. Sensitivity: Input level (mV) required for reference recording level with input (REC) level control set to maximum
8. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier OUTPUT waveform becomes clipped.
9. Reference Output Level: Playback output level when meter indicates 0 dB.
10. This model does not employ a recording/playback connector (DIN-type).

NOTE:

Specifications and the design are subject to possible modifications without notice due to improvements.

3. FRONT PANEL FACILITIES



① EJECT BUTTON

Press this button to open the cassette door. Whenever inserting or removing a cassette tape, be sure that the power is turned ON.

② POWER SWITCH

When this switch is depressed power is turned ON, and when it is depressed again, power is turned OFF. After the power is turned ON, the unit will not operate for a duration of 4 seconds which is the neccesary time for the unit to become stable.

③ CASSETTE DOOR

This door opens when the EJECT button is pressed. Insert cassette tapes with the visible part of the tape downward. When a cassette tape is inserted, the cassette door will automatically close. The cassette door will also close if it is lightly pressed. Unless the unit is powered, the door can not be opened.

> *NOTE:*
> *If the cassette door is closed after turning the power off, the next time the power is turned ON and an operating switch is pressed, the cassette door will open and close once. This is in order to reset the microprocessor to the correct condition, and is not a malfunction.*

④ STOP SWITCH

Depress this switch to stop the tape travel and to release the operating switches.

⑤ PLAY INDICATOR (►)

This indicator lights when the PLAY switch is pressed. It also lights when the REC switch is pressed to set the unit in the recording mode.

⑥ PLAY SWITCH

Depress this switch to playback a tape.

⑦ REW SWITCH

Depress this switch to rewind the tape. (The tape will travel from right to left.)

⑧ REWIND INDICATOR (◄◄)

This indicator lights when the rewind switch (REW) is pressed. The indicator lights also when the music search (MS) ◄◁ switch is pressed.

⑨ MUSIC SEARCH INDICATOR (MS)

This indicator lights when either of the music search switches (◄◁ or ▷►) is pressed.

⑩ FAST FORWARD INDICATOR (►►)

This lights when the fast forward (FF) switch is pressed. When the music search (MS) switch ▷► is pressed, the indicator also lights.

⑪ FF SWITCH

Depress this switch to send the tape forward. (The tape will travel from left to right.)

⑫ TAPE INDICATORS (NORM/CrO_2/METAL)

This mechanism uses the sensor holes on the cassette to detect the type of tape being used. It then automatically adjusts the proper recording bias and equalization for the tape. The type of tape is then shown on the tape indicator.

NORM:	This indicator lights when normal tapes are used.
CrO_2:	This indicator lights when CrO_2 tapes are used.
METAL:	This indicator lights when metal tapes are used.

NOTE:
When using metal tapes without sensor holes, the tape selector will be set on the CrO_2 position. In this case, optimum recording and erasure may not be possible. We thus recommend that you use metal tapes with sensor holes. Pre-recorded metal tapes can be played as is on this unit.

⑬ TAPE COUNTER

The numbers change as the tape is running. Tape position is indicated with a four-column digital counter.

⑭ LEVEL METER

This indicates the recording level during recording and the output level during playback. The top part is for the left (L) channel and the bottom part for the right (R) channel.

⑮ RESET BUTTON (RESET)

Press this to reset the tape counter to "0000." Before recording or playback, press this button to reset the tape counter to "0000." It will then be easy to find programs on the tape if a note is made of the tape counter numbers and of the recording or playback contents. The numbers provide you with a guideline for finding programs afterward which you want to listen to.

⑯ TAPE RETURN SWITCH (TAPE RETURN)

When this switch is pressed, the fast forward or rewind functions will begin, sending the tape to the "0000" position, where it will automatically stop. This is a convenient function when you wish to listen immediately to a program you have just recorded, or when you wish to perform repeat play of a certain program.

⑰ RECORDING LEVEL ADJUSTMENT CONTROL (INPUT)

This control is for adjusting general recording levels. The recording level increases when the control is turned clockwise, and decreases when turned counter-clockwise. The control is equipped with a memory marker useful for remembering a predetermined volume level, for example when performing fade-in.

⑱ TIMER SWITCH (TIMER)

This switch is used when an optional audio timer is utilized for unattended recording or wakeup playback.

NOTE:
The timer switch should always be in the OFF position when not performing timer recording or playback. If a cassette tape is inserted and the switch is set to the REC or PLAY position, the unit will automatically enter the recording or playback mode whenever the power switch is turned on.

⑲ PHONES JACK

This is the output jack for the stereo headphones.

⑳ RECORDING INDICATOR (●)

This lights when the unit is set to the recording mode.

㉑ REC SWITCH

This switch is pressed for recording. When the switch is pressed, the tape deck is placed in the recording standby mode, and the pause indicator (▮▮), play indicator (►) and recording indicator (●) will light. To begin recording, press the PAUSE switch to release from the recording standby mode.

NOTE:
- *The switch cannot be placed in the ON position if the accidental erasure prevention tab on the cassette have been broken off, or if no cassette is in the unit.*
- *To release the tape deck from the recording mode, press the STOP switch.*

㉒ MUSIC SEARCH SWITCH (MS)

This switch is pressed when searching for the beginning of programs.

㉓ PAUSE INDICATOR (▮▮)

This indicator lights when the PAUSE switch is pressed. It also lights when the REC switch is pressed.

㉔ PAUSE SWITCH

Depress this switch to stop the tape travel temporarily during recording or playback. Depress this switch again to allow the tape to continue to travel.
The tape does not stop during fast forward or rewind operations even when the PAUSE switch is depressed.

㉕ REC MUTE SWITCH (REC MUTE)

When the unit is in the recording mode, if this switch is pressed, 4 seconds of non-recorded interval will be created automatically. This can be used for eliminating unwanted portions during recording, or for producing an appropriate non-recorded interval between programs.

Be careful not to press this swich except when necessary.

㉖ RECORDING MUTE INDICATOR (●)

This indicator flashes when the REC MUTE switch is pressed to create an automatic 4 second non-recorded portion. When a non-recorded portion longer than 4 seconds is created, the indicator changes from flashing to steadily lighted.

㉗ AUTO MONITOR SWITCH (AUTO MONITOR)

This unit is equipped with an automatic monitor function. This means that when the unit is in the recording standby mode, SOURCE MONITOR, or when in the playback mode, TAPE MONITOR is automatically selected. However, when you wish to select TAPE/SOURCE monitoring manually, this switch can be pressed. When the switch is pressed, the unit will switch to the mode opposite to that of prior to pressing the switch. For example, if the unit is in the TAPE MONITOR mode before the switch is pressed, it will switch to the SOURCE MONITOR.
The TAPE–MONITOR–SOURCE indicators in the level meter will light to show the monitoring mode.

㉘ DOLBY NR SWITCH (DOLBY NR ON/OFF)

Press this switch ON when using the Dolby NR system for recording or playback. When the Dolby NR system is ON, the Dolby indicator B or C lights.

"Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise Reduction manufactured under license from Dolby Laboratories Licensing Corporation.

㉙ DOLBY INDICATORS (DOLBY NR)

These light when the DOLBY NR switch is set to ON .

[B]: This lights when the B type Dolby noise reduction system is operating.

[C]: This lights when the C type Dolby noise reduction system is operating.

㉚ DOLBY B/C SELECTOR SWITCH (DOLBY NR B/C)

This deck is equipped both type B and type C Dolby noise reduction systems. After the DOLBY NR ON/OFF switch is pressed, select type B or C using this switch. The Dolby indicator corresponding to the switch position lights.

㉛ MULTIPLEX INDICATOR (MPX)

This indicator lights when the Multiplex filter (MPX FILTER) switch is pressed ON.

㉜ MULTIPLEX FILTER SWITCH (MPX FILTER)

Push this switch when recording FM stereo broadcasts or TV programs using the Dolby noise reduction system.
Contained among the FM stereo signals are a 19 kHz pilot signal and the 38 kHz subcarrier. The MPX FILTER switch is pressed in order to safeguard against incorrect operation of the Dolby circuit due to these signals. Release the switch for any other recording. The switch does not function during playback.

㉝ OUTPUT LEVEL VOLUME CONTROLS (OUTPUT LEVEL)

These controls are for adjusting the deck's output level. When the controls are turned clockwise, output level is increased.

NOTE:

- *The movement of the level meters is not affected by rotation of the output level volume controls.*
- *If the output level control is set at the minimum "0" position, no sound will be heard, even if the amplifier's volume control is rotated.*

㉞ MONITOR INDICATOR (MONITOR)

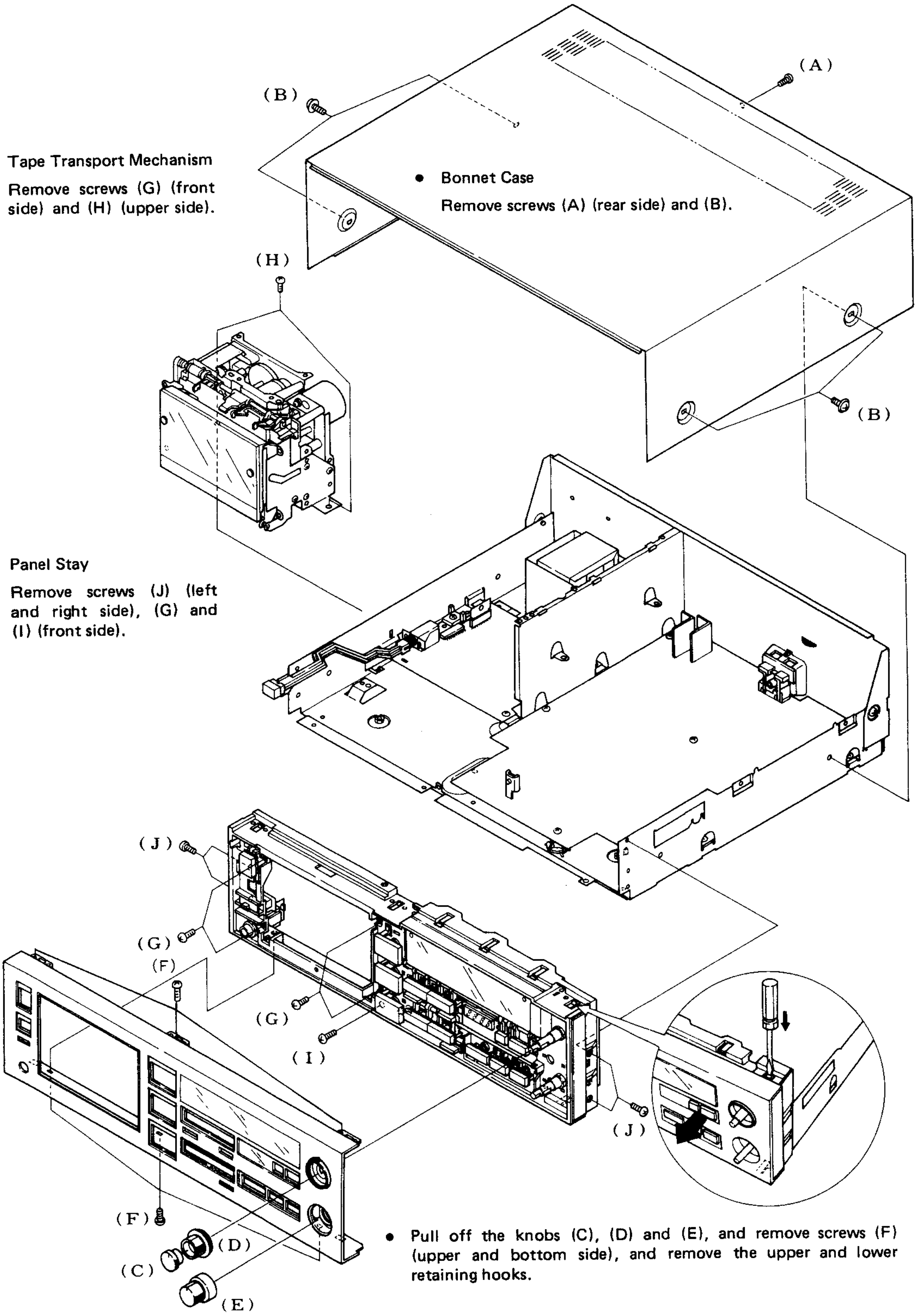
This indicator shows the monitoring mode selected by the automatic monitoring function.

DOLBY TYPES B AND C

The tape hiss (noise mainly in the high-frequency range) heard when a recorded tape is played back can be very irritating. This is particularly the case in pianissimo treble sections where violins, for instance, are heard in an orchestral piece. The Dolby noise reduction system was developed in order to reduce this tape hiss. The Dolby type B system is already widely used for noise reduction but this unit features not only this type but also type C.
What the system does is this: when the midrange and treble sections, where the tape hiss is noticeable, are lower than the prescribed level, it records those sections at a level higher than the recording level at the "OFF" position of the Dolby system. During playback, the level is reduced by an amount equivalent to this increase and the sound is played back with a reduction in tape hiss. This operation is performed automatically in accordance with the strength of the input signals, and it is possible to improve the signal-to-noise ratio at frequencies over 5 kHz by about 10 dB. As a result, the system is really effective for the recording and playback of ordinary broadcasts and records, etc.
However, when recording a program source with a wide dynamic range, a greater reduction in the noise is required. It was for this reason that the Dolby type C system was developed.
The big difference between type B and type C is that the improvement in the high-frequency range noise is approximately a high 19 dB, compared with the "OFF" position of the Dolby system, and that the dynamic range is extended without causing the sound quality to change (without generating breathing noise).

- A note should be made of each tape recorded with the Dolby system so that it is not mistakenly played back with the Dolby system off.
- Always play back tapes with the same Dolby function which was used when they were recorded. Playing back a tape recorded with the Dolby system at the OFF (non-Dolby) position or playing back a normal tape with the Dolby system will not result in the faithful reproduction of the original sound.

4. DISASSEMBLY



- Bonnet Case
  Remove screws (A) (rear side) and (B).

- Tape Transport Mechanism
  Remove screws (G) (front side) and (H) (upper side).

- Panel Stay
  Remove screws (J) (left and right side), (G) and (I) (front side).

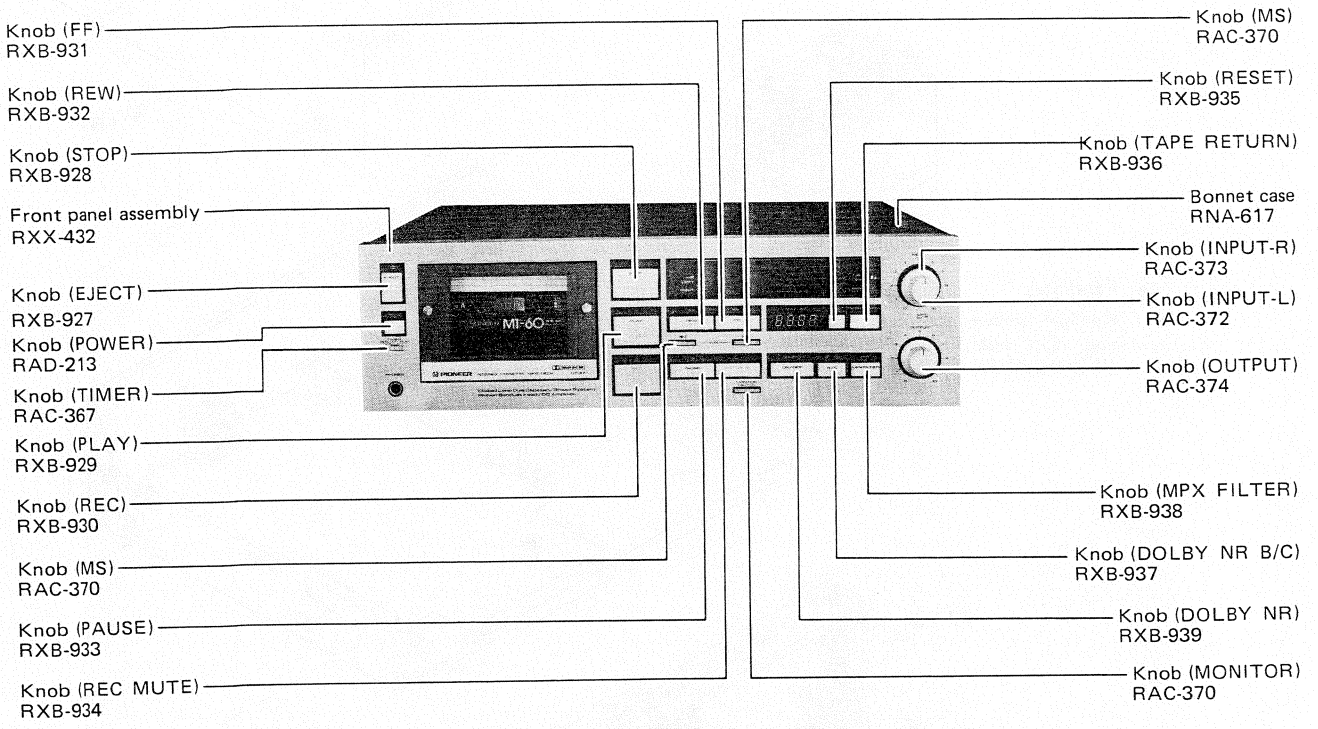
- Pull off the knobs (C), (D) and (E), and remove screws (F) (upper and bottom side), and remove the upper and lower retaining hooks.

5. PARTS LOCATION

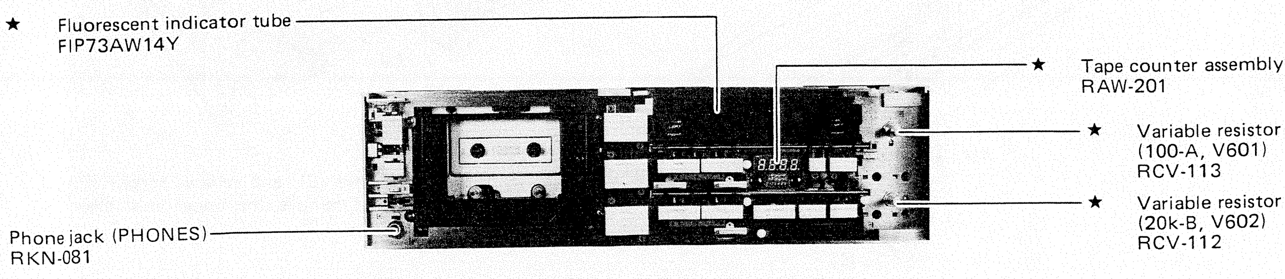
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

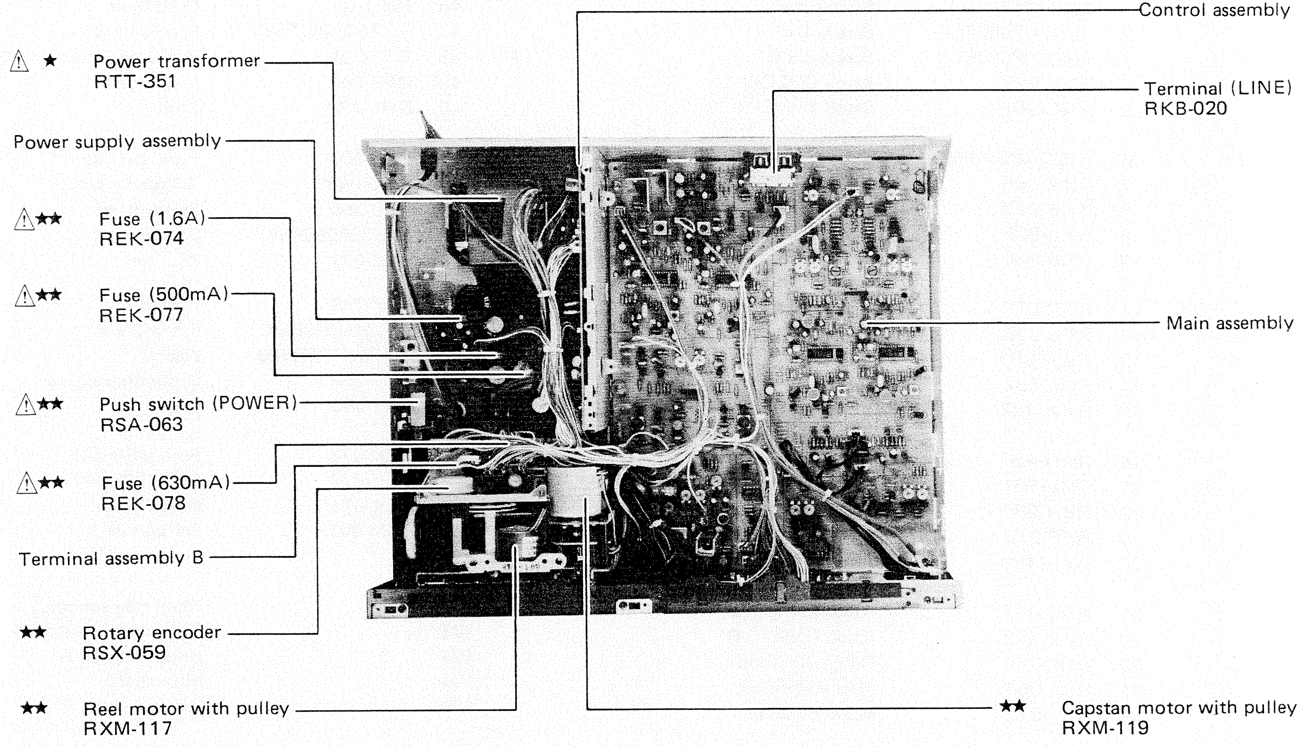
Front Panel View


Knob (FF)
RXB-931
Knob (REW)
RXB-932
Knob (STOP)
RXB-928
Front panel assembly
RXX-432
Knob (EJECT)
RXB-927
Knob (POWER)
RAD-213
Knob (TIMER)
RAC-367
Knob (PLAY)
RXB-929
Knob (REC)
RXB-930
Knob (MS)
RAC-370
Knob (PAUSE)
RXB-933
Knob (REC MUTE)
RXB-934
Knob (MS)
RAC-370
Knob (RESET)
RXB-935
Knob (TAPE RETURN)
RXB-936
Bonnet case
RNA-617
Knob (INPUT-R)
RAC-373
Knob (INPUT-L)
RAC-372
Knob (OUTPUT)
RAC-374
Knob (MPX FILTER)
RXB-938
Knob (DOLBY NR B/C)
RXB-937
Knob (DOLBY NR)
RXB-939
Knob (MONITOR)
RAC-370
MI-60
PIONEER

Front View with Panel Removed


★ Fluorescent indicator tube
FIP73AW14Y
★ Tape counter assembly
RAW-201
★ Variable resistor
(100-A, V601)
RCV-113
★ Variable resistor
(20k-B, V602)
RCV-112
Phone jack (PHONES)
RKN-081

Top View


Control assembly
⚠ ★ Power transformer
RTT-351
Terminal (LINE)
RKB-020
Power supply assembly
⚠★★ Fuse (1.6A)
REK-074
⚠★★ Fuse (500mA)
REK-077
Main assembly
⚠★★ Push switch (POWER)
RSA-063
⚠★★ Fuse (630mA)
REK-078
Terminal assembly B
★★ Rotary encoder
RSX-059
★★ Reel motor with pulley
RXM-117
★★ Capstan motor with pulley
RXM-119

6. EXPLODED VIEW

- *Parts without part number cannot be supplied.*
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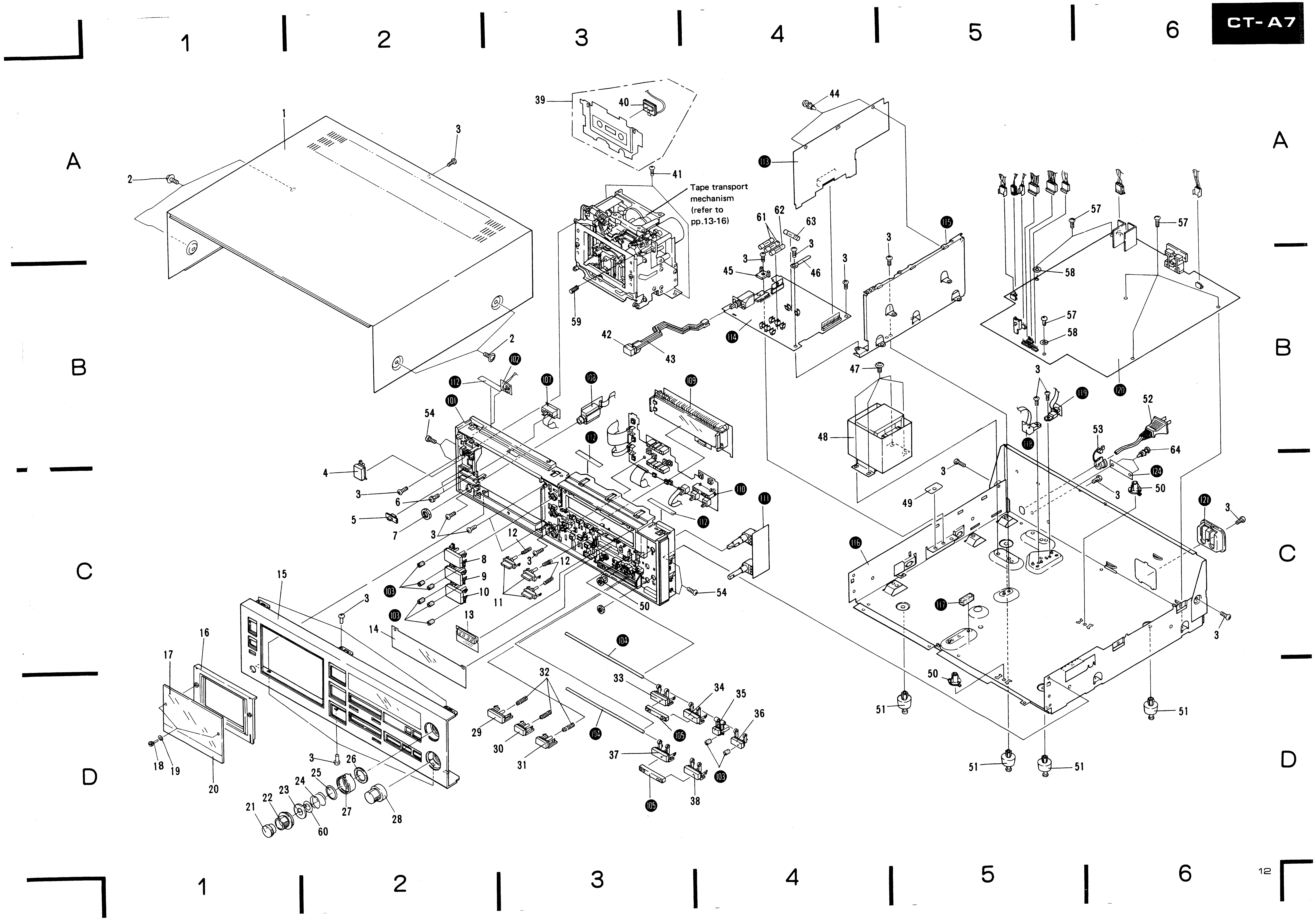
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	No.	Part No.	Description
	1	RNA-617	Bonnet case
	2	FBT40P080FNi	Screw 4 x 8
	3	BBZ30P080FZK	Screw 3 x 8
	4	RXB-927	Knob (EJECT)
	5	RAC-367	Knob (TIMER)
	6	PMZ26P060FMC	Screw 2.6 x 6
	7	RBN-006	Nut
	8	RXB-928	Knob (STOP)
	9	RXB-929	Knob (PLAY)
	10	RXB-930	Knob (REC)
	11	RAC-370	Knob (MS,MONITOR)
	12	RBL-056	Knob spring A
	13	RAW-201	Tape counter assembly
	14	RNL-797	Meter screen
	15	RXX-432	Front panel assembly
	16	RAH-487	Door frame
	17	RNL-761	Door
	18	RBA-085	Dressing screw
	19	RBF-075	Washer
	20	RAH-490	Inscription plate
	21	RAC-372	Knob (INPUT L)
	22	RAC-373	Knob (INPUT R)
	23	RNL-764	Ring with hook
	24	RBL-054	Marker spring
	25	RBF-072	Marker washer
	26	RED-203	Friction felt
	27	RAC-371	Marker
	28	RAC-374	Knob (OUTPUT)
	29	RXB-939	Knob (DOLBY NR)
	30	RXB-937	Knob (B/C)
	31	RXB-938	Knob (MPX FILTER)
	32	RBL-060	Knob spring B
	33	RXB-932	Knob (REW)
	34	RXB-931	Knob (FF)
	35	RXB-935	Knob (RESET)
	36	RXB-936	Knob (TAPE RETURN)
	37	RXB-933	Knob (PAUSE)
	38	RXB-934	Knob (REC MUTE)
	39	RXX-431	Cassette plate assembly
★	40	SLF-201C	LED
	41	VBT30P060FMC	Screw 3 x 6
	42	RAD-213	Knob (POWER)
	43	RNL-766	Rod
	44	RBM-003	Nylon rivet
	45	RNK-511	Upper guide

Mark	No.	Part No.	Description
	46	RNH-184	Cord fixer
	47	VBZ40P080FMC	Screw 4 x 8
⚠ ★	48	RTT-351	Power transformer (120V)
	49	REB-508	Insulator
	50	RNL-792	Stud
⚠	51	REC-369	Foot assembly
⚠	52	RDG-048	AC power cord
⚠	53	REC-395	Strain relief
	54	BBZ30P060FMC	Screw
	55	REC-371	Wire tie
	56	RBF-078	Washer
	57	ATZ30P080FMC	Screw 3 x 8
	58	WA30W120R100	Washer
	59	RBL-059	Grounding spring
	60	RBF-080	Washer
⚠★★	61	REK-078	Fuse (630mA)
⚠★★	62	REK-077	Fuse (500mA)
⚠★★	63	REK-074	Fuse (1.6A)
	64	RBM-001	Plastic rivet
	65		
	101		Panel stay assembly
	102		Eject switch assembly
	103		Knob cushion A
	104		Main shaft
	105		Knob cushion B
	106	....	
	107		Timer switch assembly
	108		Headphones jack assembly
	109		Level meter assembly
	110		Operation switch assembly
	111		Level control assembly
	112		Cushion
	113		Control assembly
	114		Power supply assembly
	115		P.C. board holder
	116		Chassis
	117		Cushion
	118		Transistor A assembly
	119		Transistor B assembly
	120		Main assembly
	121		Phono jack spacer
	122		Cushion D



Tape transport mechanism (refer to pp.13-16)

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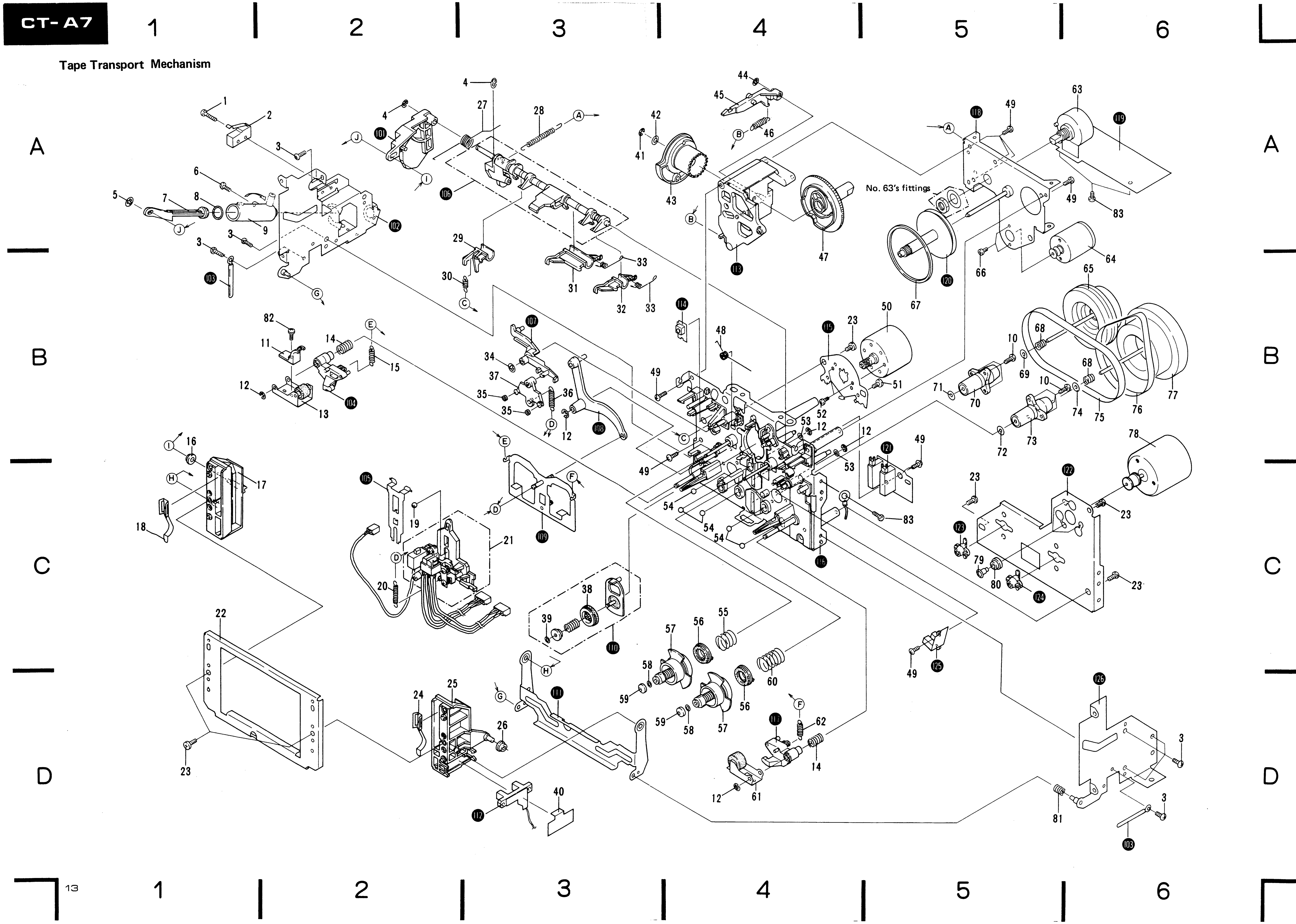
Tape Transport Mechanism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No. 63's fittings
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- *Parts without part number cannot be supplied.*
- *The ⚠ make found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Precaution when replacing heads (*1)*
  Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (RXX-433) be disassembled.

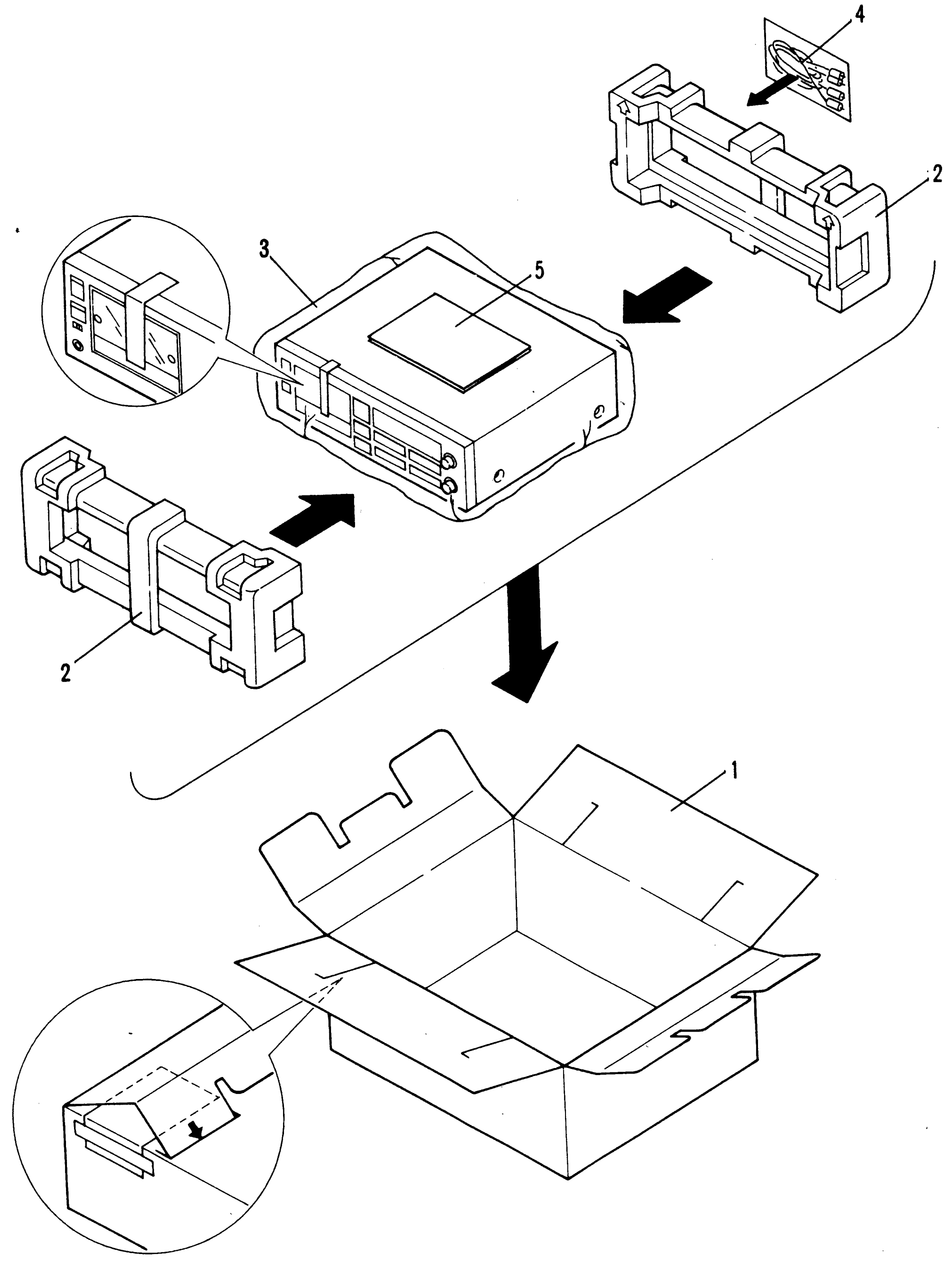
Tape Transport Mechanism

Mark	No.	Part No.	Description
	1	BMZ23P100FZK	Screw 2.3 x 10
★★	2	RSF-031	Microswitch (S084)
	3	VCT30P060FZK	Screw 3 x 6
	4	YE30FUC	Washer E-type
	5	YS24FBT	Washer C-type
	6	VCZ26P080FMC	Screw 2.6 x 8
	7	RNL-739	Piston
	8	REB-447	O-ring
	9	RNL-740	Cylinder
	10	PMA26P050FZK	Screw 2.6 x 5
	11	RNL-016	Tape guide
	12	YE25FUC	Washer E-type
★★	13	RXB-877	Pinch roller arm L assembly
	14	RBL-030	Pinch thrust spring
	15	RBL-029	Sub-pinch spring
	16	RNL-742	Collar
	17	RNL-736	Pocket L
	18	RBL-027	Pocket spring
	19	REF-022	Steel ball (ϕ3)
	20	RBL-037	Head base spring
★★	21	RXX-433 (*1)	Head base assembly
	22	RNH-305	Pocket frame
	23	BBZ30P080FZK	Screw 3 x 8
	24	RBL-027	Pocket spring
	25	RNL-737	Pocket R
	26	RNL-742	Collar
	27	RBL-039	Eject spring
	28	RBL-040	Half hold spring
	29	RNL-733	REC detector arm
	30	RBL-041	REC detector arm spring
	31	RNL-735	METAL detector arm
	32	RNL-734	CrO_2 detector arm
	33	RBL-042	Detector arm spring
	34	YS24FBT	Washer C-type
★	35	REB-511	Brake shoe
	36	RBL-038	Brake spring
	37	RNL-723	Brake
★★	38	RNL-549	Take-up idler
	39	WA15D030D050	Washer
	40	REC-419	Cover
	41	YE20FUC	Washer E-type
	42	WA26N070W040	Washer
	43	RXB-884	Side cam gear assembly
	44	YS24FBT	Washer C-type
	45	RNL-741	Lock lever
	46	RBL-043	Lock lever spring
	47	RNL-729	Cam gear
	48	RBL-033	Idler pressure spring
	49	BBZ26P080FZK	Screw 2.6 x 8
★★	50	RXM-117	Reel motor with pulley
	51	BMZ30P080FZK	Screw 3 x 8
	52	BMZ26P030FZK	Screw 2.6 x 3
	53	WA32D080D050	Washer
	54	REF-023	Steel ball (ϕ4)
	55	RBL-031	BT spring A
	56	RXB-751	BT disk assembly
	57	RXB-874	Reel base assembly
	58	RBF-079	Washer
	59	RNK-815	Cap B
	60	RBL-032	BT spring B
	61	RXB-876	Pinch roller arm R assembly
	62	RBL-028	Pinch spring
★★	63	RSX-059	Rotary encoder
★★	64	RXM-113	Assist motor with pulley
	65	RXB-889	Sub-flywheel assembly
	66	BMZ20P030FZK	Screw 2 x 3
★★	67	REB-502	Drive belt
	68	RBL-044	Thrust spring
	69	RBF-070	Thrust washer B
	70	RXB-466	Capstan holder B
	71	RBF-077	Oil stopper washer
	72	RBF-030	Oil stopper
	73	RXB-362	Capstan holder A
	74	RBF-069	Thrust washer A
★★	75	REB-509	Capstan belt A
★★	76	REB-501	Capstan belt
	77	RXB-888	Flywheel assembly
★★	78	RXM-119	Capstan motor with pulley
	79	RBA-064	Screw
	80	REB-408	Rubber bush
	81	RBL-045	Spring
	82	PMA26P060FZK	Screw 2.6 x 6
	83	VCZ30P060FMC	Screw 3 x 6
	84	....	
	85	....	
	101		Eject lever
	102		Door frame L assembly
	103		Cord fixer
	104		Pressure arm L
	105		Head base hold spring
	106		Shift shaft assembly
	107		Brake lever
	108		Pinch lever assembly
	109		Pinch base assembly
	110		Take-up idler assembly
	111		Door arm
	112		Cassette half sensor assembly
	113		Gear base assembly
	114		REC detector assembly
	115		Reel motor base
	116		Chassis
	117		Pressure arm R
	118		Gear chassis
	119		Terminal assembly
	120		Second pulley assembly
	121		Tape selector assembly
	122		Motor chassis
	123		Thrust holder
	124		Thrust holder
	125		Rotation sensor assembly
	126		Door frame R assembly
	127		Pocket frame

7. PACKING

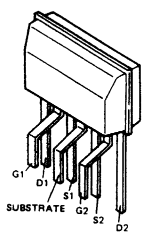
Packing

Mark	No.	Part No.	Description
	1	RHG-688	Packing case
	2	RHA-259	Pad
	3	RHX-030	Sheet
	4	RDE-010	Connection cord
	5	RRB-224	Operating instructions (English)

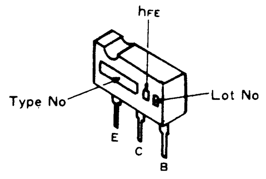


External Appearance of Transistors and ICs

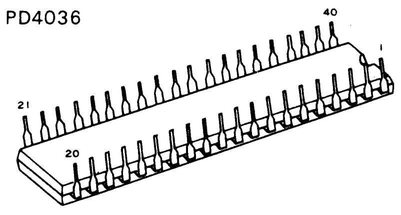
2SK389


G1
D1
S1
SUBSTRATE
G2
S2
D2

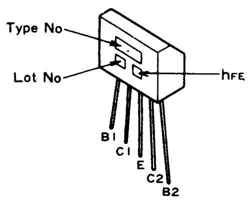
2SC2673


hFE
Type No
Lot No
E
C
B

PD4036



2SA798


Type No
Lot No
hFE
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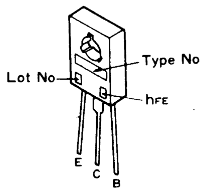
C2
B2

2SD1189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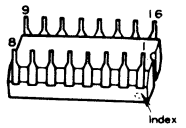
BA6251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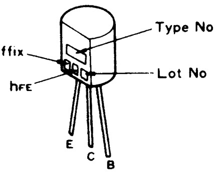
2SC1740LN
2SA933LN
2SD1302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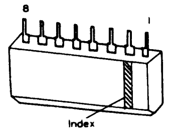
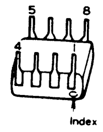
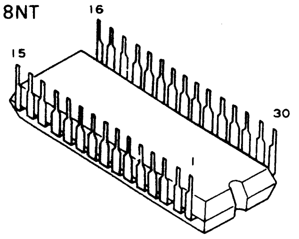
M5218L



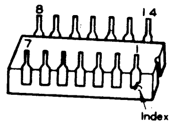
NJM2903D



HA12058NT



TC4066BP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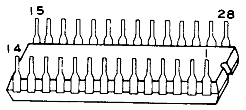
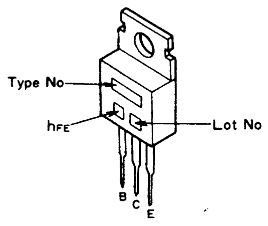
AN6870N



2SD880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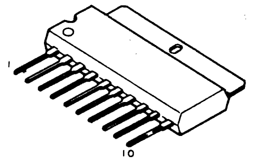
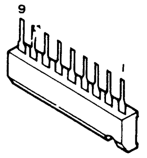
BA6109



BA335
BA715



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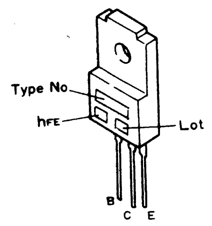
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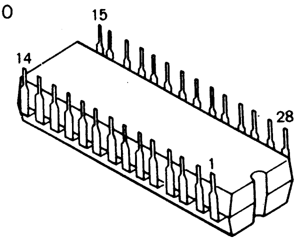
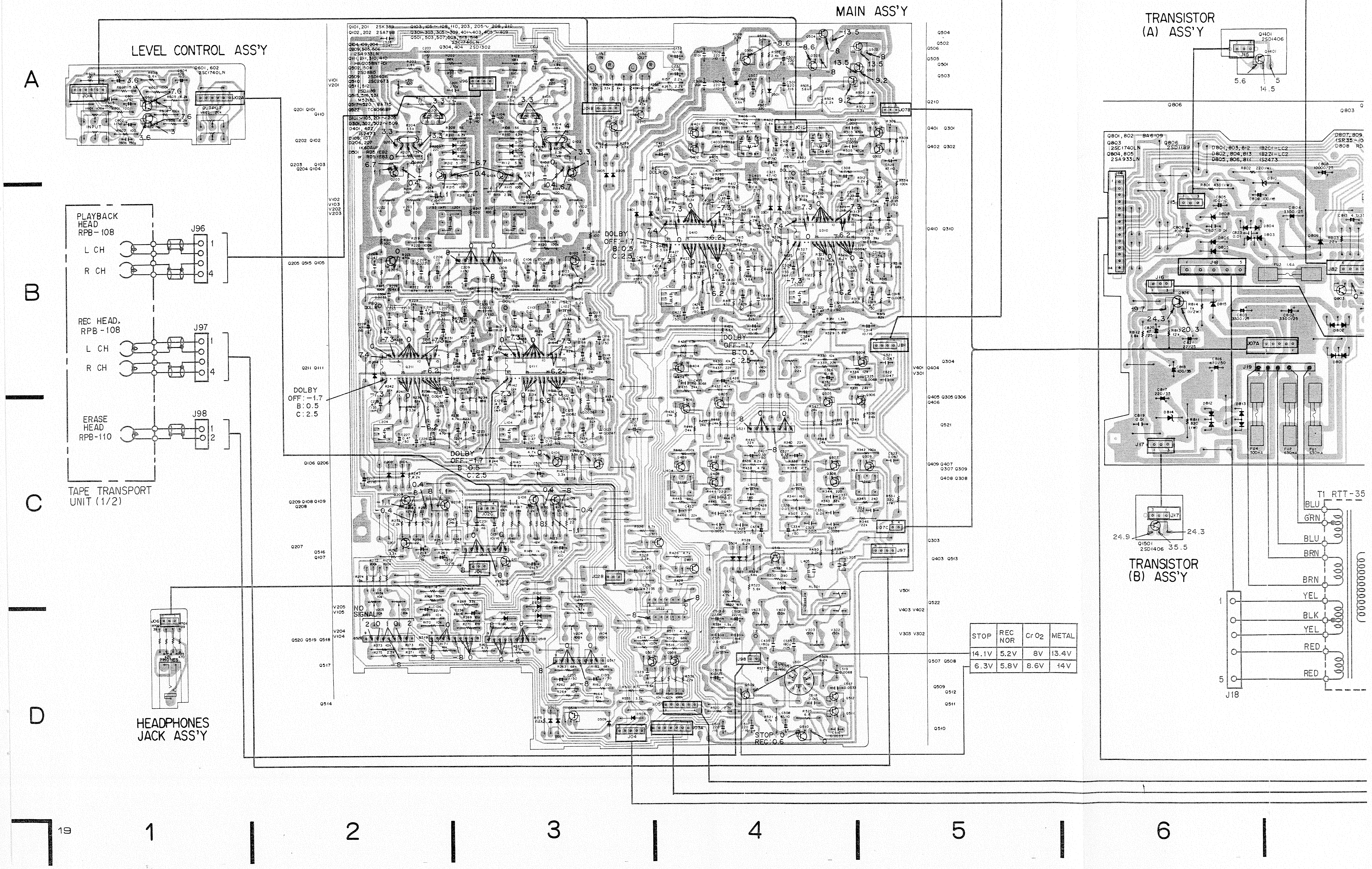
LC7800



8. P.C.BOARDS CONNECTION DIAGRAM


1
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MAIN ASS'Y
LEVEL CONTROL ASS'Y
Q601, 602 2SC1740LN
INPUT
OUTPUT
J01A
J02A
TRANSISTOR (A) ASS'Y
Q401 2SD1406
J15
PLAYBACK HEAD RPB-108
L CH
R CH
J96
REC HEAD. RPB-108
J97
ERASE HEAD RPB-110
J98
TAPE TRANSPORT UNIT (1/2)
HEADPHONES JACK ASS'Y
J06
PHONES
DOLBY OFF: -1.7 B: 0.5 C: 2.5
NO SIGNAL
STOP: 0 REC: 0.6
J01B
J02B
J04
J05
J07B
J07A
J07C
J08
J16
J17
J18
J19
J82
Q801, 802 BA6109
Q803 2SC1740LN
Q804, 805 2SA933LN
Q806 2SD1189
D801, 803, 812 IB2CI-LC2
D802, 804, 813 IB2ZI-LC2
D805, 806, 811 IS2473
FU1 630mA
FU2 630mA
FU4 500mA
TRANSISTOR (B) ASS'Y
Q1501 2SD1406
24.9
24.3
35.5
T1 RTT-35
BLU
GRN
BLU
BRN
BRN
YEL
BLK
YEL
RED
RED
1
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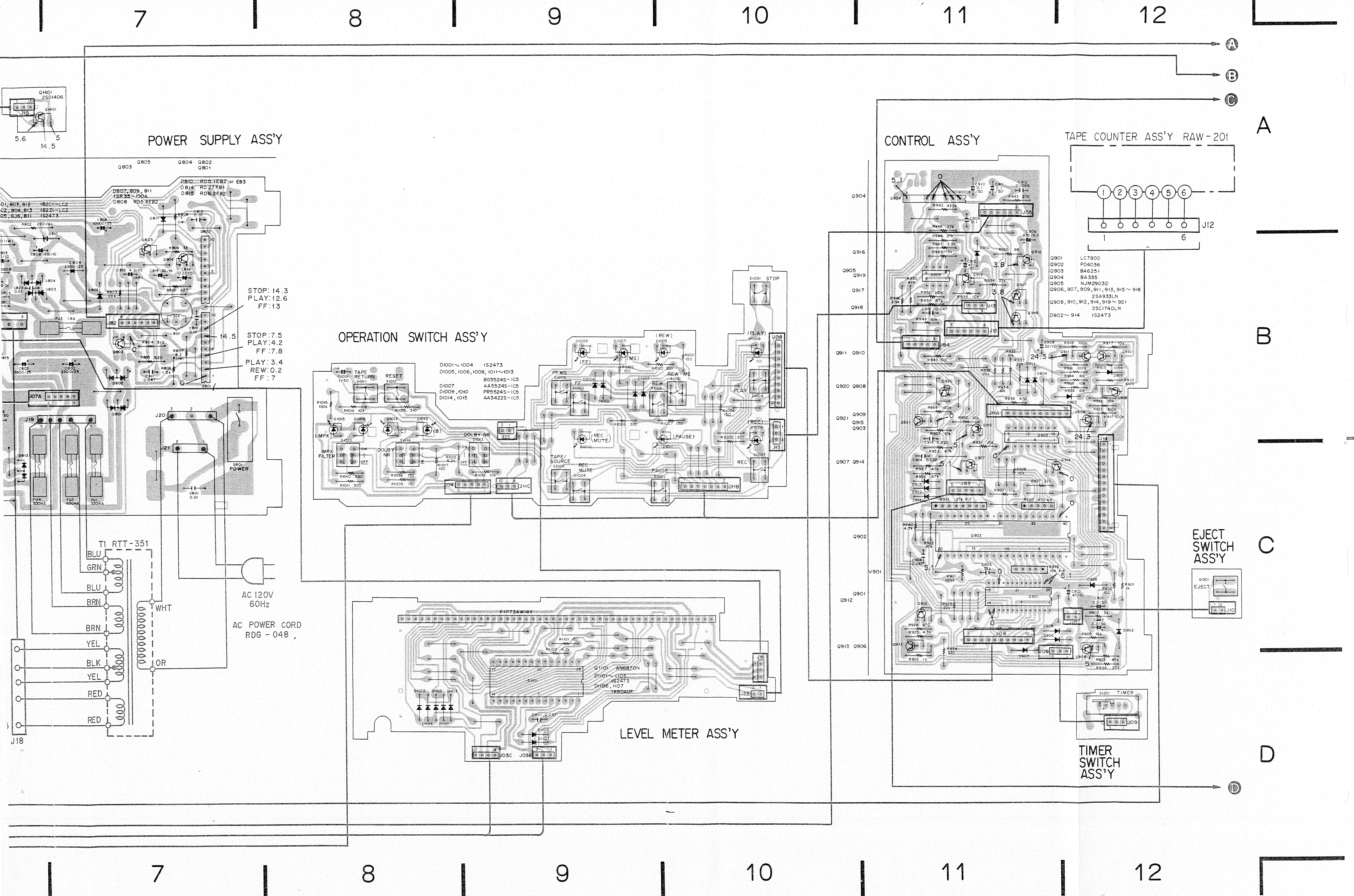
J18

STOP	REC NOR	Cr O2	METAL
14.1V	5.2V	8V	13.4V
6.3V	5.8V	8.6V	14V



POWER SUPPLY ASS'Y
OPERATION SWITCH ASS'Y
CONTROL ASS'Y
TAPE COUNTER ASS'Y RAW-201
LEVEL METER ASS'Y
EJECT SWITCH ASS'Y
TIMER SWITCH ASS'Y
T1 RTT-351
AC 120V 60Hz
AC POWER CORD RDG-048
STOP:14.3
PLAY:12.6
FF:13
STOP:7.5
PLAY:4.2
FF:7.8
PLAY:3.4
REW:0.2
FF:7
14.5
Q1401 2SD1406
5.6
14.5
5
D807,809,811 1SR35-100A
D808 RD5.6EB2
D810 RD5.1EB2 or EB3
D814 RD27FB1
D815 RD6.2FB2
D1001~1004 1S2473
D1005,1006,1008,1011~1013
D1007 BG5524S-1C5
D1009,1010 AA5524S-1C5
D1014,1015 PR5524S-1C5
AA3422S-1C5
Q901 LC7800
Q902 PD4036
Q903 BA6251
Q904 BA335
Q905 NJM2903D
Q906,907,909,911,913,915~918 2SA933LN
Q908,910,912,914,919~921 2SC1740LN
D902~914 1S2473
Q1101 AN6870N
D1101~1105 1S2473
D1106,1107 1K60AUF
FIP7AW14Y
S801 POWER
S1001 STOP
S1301 EJECT
S1201 TIMER
BLU
GRN
BLU
BRN
BRN
YEL
BLK
YEL
RED
RED
WHT
OR
J18
J12
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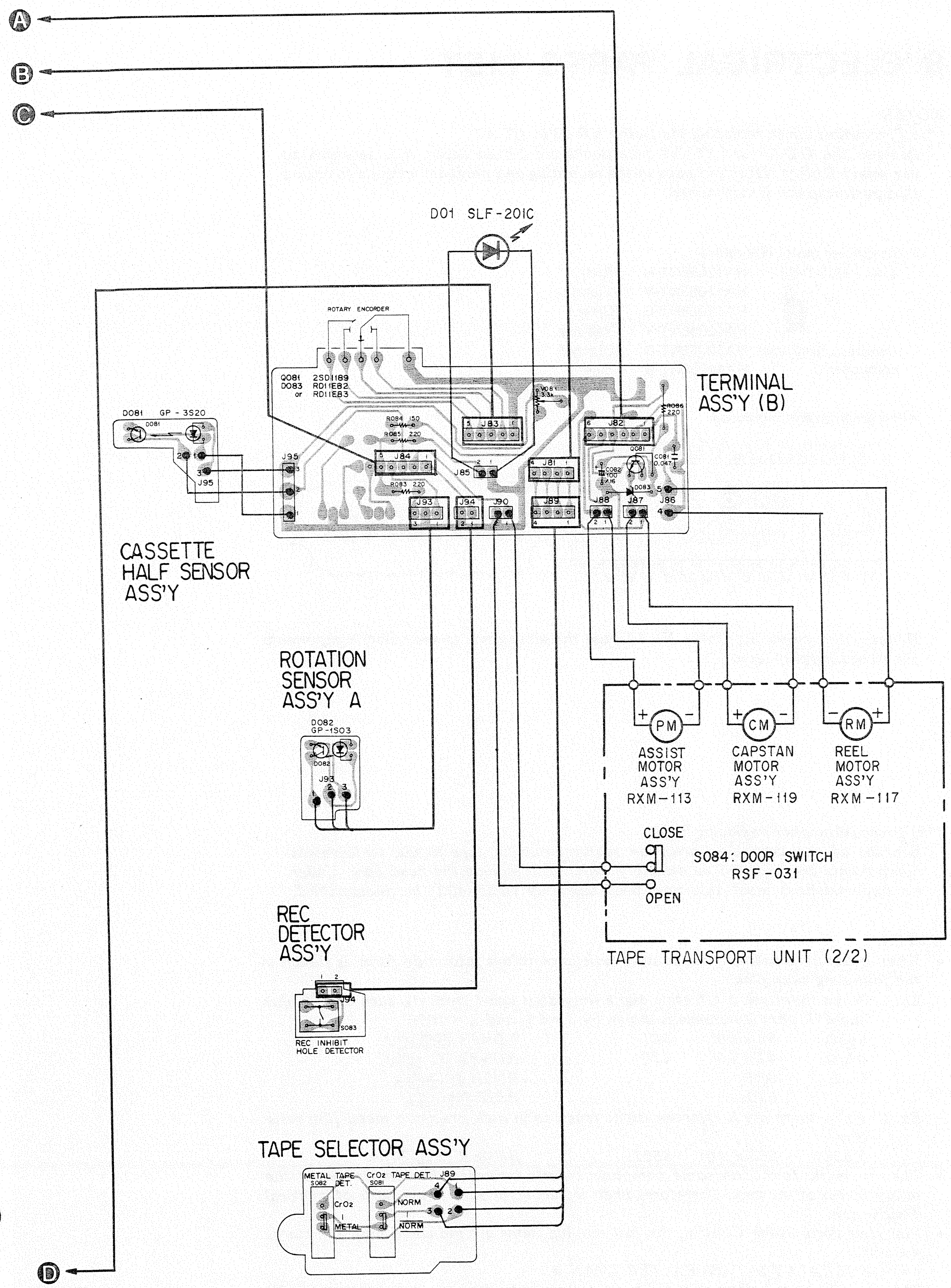
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Ⓓ
D01 SLF-201C
ROTARY ENCORDER
Q081 2SD1189
D083 RD11EB2
or RD11EB3
TERMINAL ASS'Y (B)
V081 3.3k
R086 220
R084 150
R085 220
R083 220
J83
J82
J84
J85
J81
Q081
C081 0.047
C082 100 / 16
D083
J95
J93
J94
J90
J89
J88
J87
J86
D081 GP-3S20
D081
CASSETTE HALF SENSOR ASS'Y
ROTATION SENSOR ASS'Y A
D082 GP-1S03
D082
J93
REC DETECTOR ASS'Y
J94
S083
REC INHIBIT HOLE DETECTOR
TAPE SELECTOR ASS'Y
METAL TAPE DET.
S082
CrO2 TAPE DET.
S081
J89
CrO2
METAL
NORM
NORM
PM
CM
RM
ASSIST MOTOR ASS'Y RXM-113
CAPSTAN MOTOR ASS'Y RXM-119
REEL MOTOR ASS'Y RXM-117
CLOSE
OPEN
S084: DOOR SWITCH RSF-031
TAPE TRANSPORT UNIT (2/2)

9. ELECTRICAL PARTS LIST

NOTES:

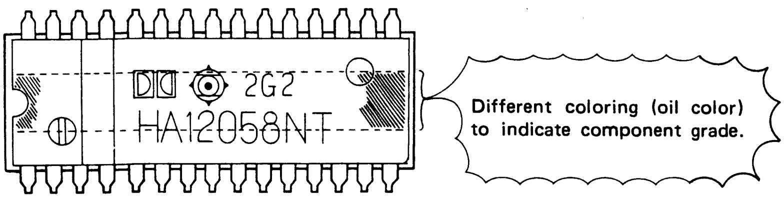
*(*1) Precaution when replacing the Dolby NR IC in CT-A7*

Because the CT-A7 and CT-A9 tape decks are 3-head decks, it is necessary to use select Dolby NR ICs in pairs in the recording and playback circuits to ensure that performance is maintained.

- **Pair-grading ranks (Six ranks)**

HA12058NT-01 → HA12058NT-R (Red)
HA12058NT-V (Violet)
HA12058NT-G (Green)
HA12058NT-Y (Yellow)
Denotes pair-graded HA12058NT-O (Orange)
component. HA12058NT-B (Blue)

- **Pair-grading rank indication**



Hence, when replacing Dolby NR ICs, use the same grade (same color) components for recording/playback.

*(*2) Precaution when replacing heads*

Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (RXX-433) be disassembled.

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

  560Ω 56 x 10¹ 561 .... RD¼PS $\boxed{5}\boxed{6}\boxed{1}$ *J*
  47kΩ 47 x 10³ 473 .... RD¼PS $\boxed{4}\boxed{7}\boxed{3}$ *J*
  0.5Ω 0R5 .... RN2H $\boxed{0}\boxed{R}\boxed{5}$ *K*
  1Ω 010 .... RS1P $\boxed{0}\boxed{1}\boxed{0}$ *K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

  5.62kΩ 562 x 10¹ 5621......... RN¼SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$ *F*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*

  ★★ GENERALLY MOVES FASTER THAN ★.

  This classification shall be adjusted by each distributor because it depends on model number , temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	Non supply	Terminal assembly B
	Non supply	REC detector assembly
	Non supply	Tape selector assembly
	Non supply	Cassette half sensor assembly
	Non supply	Rotation sensor assembly
	Non supply	Main assembly
	Non supply	Level control assembly
	Non supply	Headphones jack assembly
	Non supply	Power supply assembly
	Non supply	Control assembly
	Non supply	Operation switch assembly
	Non supply	Timer switch assembly
	Non supply	Eject switch assembly
	Non supply	Transistor A assembly
	Non supply	Transistor B assembly
	Non supply	Level meter assembly

FUSES

Mark	Part No.	Symbol & Description
⚠★★	REK-078	FU1, FU2 Fuse (630mA)
⚠★★	REK-074	FU3 Fuse (1.6A)
⚠★★	REK-077	FU4 Fuse (500mA)

OTHERS

Mark	Part No.	Symbol & Description
⚠ ★	RTT-351	T1 Power transformer (120V)
⚠	RDG-048	AC power cord
★	SLF-201C	D01 LED (Tape illumination)
★★	RXX-433 (*1)	Head base assembly
	RAW-201	Tape counter assembly
★★	RXM-119	CM Capstan motor with pulley
★★	RXM-113	PM Assist motor with pulley
★★	RXM-117	RM Reel motor with pulley
★★	RSF-031	S084 Microswitch
★★	RSX-059	Rotary encoder

Main Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SK389	Q101, Q201
★★	2SA798	Q102, Q202
★★	2SC1740LN	Q103, Q105 – Q108, Q110, Q203, Q205 – Q208, Q210, Q301 – Q303, Q305 – Q309, Q401 – Q403, Q405 – Q409, Q501, Q503, Q507, Q508, Q513, Q514
★★	2SA933LN	Q104, Q109, Q204, Q209, Q505, Q506
★★	HA12058NT-01 (*2)	Q111, Q211, Q310, Q410
⚠★★	2SD880	Q502, Q504
⚠★★	2SD1406	Q509
★★	2SC2673	Q510
★★	2SD1189	Q511, Q512
★★	M5218L	Q515, Q516, Q521
★★	BA715	Q517 – Q520
★★	TC4066BP	Q522
★★	2SD1302	Q304, Q404
★	1S2473	D101 – D105, D201 – D205, D301, D302, D401, D402, D502 – D509
★	1K60AUF	D106, D107, D206, D207
⚠ ★	RD5.1EB2 (RD5.1EB3)	D501

COILS, FILTERS

Mark	Part No.	Symbol & Descripton
	RTF-162	L101, L201 Trap coil
	RTF-153	L102, L103, L202, L203 Trap coil
	RTF-159	L104, L204, L302, L402 SS coil
	RTF-154	L301, L401 MPX filter
	RTF-125	L303, L403 Peaking coil
	RTF-148	L304, L404 Peaking coil
	RTF-152	L305, L405 Trap coil
	RTD-029	L501 Oscillator coil
	RTF-101	L502 Line coil

CAPACITORS

Mark	Part No.	Symbol & Description
	CQSA 271K 50	C101, C201
	CEA 221M 10	C305
	CEANP 4R7M 35	C105, C129, C130, C205, C229, C230, C324, C424, C524
	CEA R15M 50	C116, C126, C216, C226, C310, C321, C410, C421
	CEA R33M 50	C117, C217, C311, C327, C411, C427
	CEA R47M 50	C119, C127, C219, C227, C313, C322, C413, C422
	CEA R68M 50	C118, C218, C312, C412
	CEA 010M 50	C109, C135, C209, C235
	CEA 4R7M 50	C114, C124, C214, C224, C308, C319, C334, C408, C419, C434
	CEA 100M 16	C106, C131 – C133, C206, C231 – C233, C301, C314, C326, C401, C414, C426, C526
	CEA 220M 16	C136, C236, C512, C513
	CEA 470M 10	C110, C128, C210, C228, C304, C323, C404, C423, C503, C508, C525
	CEA 101M 25	C509
	CEA 101M 10	C103, C104, C134, C203, C204, C243
	CEA 221M 16	C501, C502, C510, C511
	CEA 221M 10	C111, C211, C405, C504, C506
	CQMA 122J 50	C302, C402
	CQMA 392J 50	C303, C403
	CQMA 332K 50	C516, C517
	CQMA 472K 50	C122, C123, C222, C223, C317, C318, C417, C418
	CQMA 562J 50	C121, C221, C316, C333, C416, C433
	CQMA 682J 50	C325, C425, C519
	CQMA 103J 50	C113, C213, C307, C328, C330 – C332, C407, C428, C430 – C432
	CQMA 153J 50	C518
	CQMA 333J 50	C112, C212, C306, C406
	CQMA 183K 50	C115, C215, C309, C409
	CQMA 223J 50	C107, C207
	CQMA 823J 50	C125, C225, C320, C420
	CQMA 154K 50	C102, C202
	CQPA 153J 100	C520
	CQSA 181K 125	C335, C435
	CQMA 152J 50	C329, C429
	CEA 101M 16	C527
	CQMA 332J 50	C533, C534
	CCPSL 390J 50	C120, C220, C315, C415
	CKDYF 103Z 50	C505, C507, C514, C515, C529
	CKDYF 473Z 50	C108, C208, C521 – C523, C528

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before*

Mark	Part No.	Symbol & Description
★	RCP-140	V101, V201 Semi-fixed 220-B
★	RCP-144	V102, V202 Semi-fixed 1k-B
★	RCP-149	V103, V105, V203, V205 Semi-fixed 10k-B
★	RCP-154	V104, V204 Semi-fixed 100k-B
★	RCP-150	V301, V401 Semi-fixed 22k-B
★	RCP-155	V302, V303, V402, V403 Semi-fixed 150k-B
★	RCP-147	V501 Semi-fixed 4.7k-B
⚠	RS1LF □□□ J	R530, R531
	RD1/4PM □□□ J	Other resistors

OTHERS

Mark	Part No.	Symbol & Description
	RKB-020	Terminal (LINE)
★★	RSR-037	RL501 Miniature relay
	RNH-209	Shield Case

Level Control Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC1740LN	Q601, Q602

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Description
★	RCV-113	V601 Variable 100k-A
★	RCV-112	V602 Variable 20k-B
	RD1/4PM □□□ J	R601 – R609

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 010M 50	C601, C602,
	CEA 101M 10	C603, C604
	CCDSL 151K 50	C605, C606

Headphones Jack Assembly

RESISTORS

Mark	Part No.	Symbol & Description
	RD1/4PM 390J	R701, R702
	RD1/4PM 471J	R703, R704

OTHER

Mark	Part No.	Symbol & Description
	RKN-081	Phone jack (PHONES)

Control Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	LC7800	Q901
★★	PD4036	Q902
★★	BA6251	Q903
★★	BA335	Q904
★★	NJM2903D	Q905
★★	2SA933LN	Q906, Q907, Q909, Q911, Q913, Q915 – Q918
★★	2SC1740LN	Q908, Q910, Q912, Q914, Q919 – Q921
★	1S2473	D902 – D914

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 2R2M 50	C901, C902
	CEA 220M 10	C908
	CEA 470M 10	C903, C913
	CEA R10M 50	C910, C911
	CEA 471M 6R3	C906
	CQMA 223K 50	C914, C915
	CQMA 104J 50	C909
	CQMA 682K 50	Q912
	CCDCH 330J 50	C905
	CKDYF 473Z 50	C904, C916

RESISTORS

Note: *When ordering resistors, convert the resistance value into code fom, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Description
★	RCP-154	V901 Semi-fixed 100k-B
	RM4-103J	R919
	RM4-473J	R920
	RM7-473J	R921
	RD1/4PM □□□J	Other resistors

Level Meter Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	AN6870N	Q1101
★	1S2473	D1101 - D1105
★	1K60AUF	D1106, D1107

CAPACITOR

Mark	Part No.	Symbol & Description
	CQMA 473K 50	C1101

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Description
	RD1/4PM □□□J	R1101, R1102

OTHERS

Mark	Part No.	Symbol & Description
★	FIP73AW14Y	Fluorescent indicator tube

Terminal Assembly B

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SD1189	Q081
★	RD11E (RD11EB2) (RD11EB3)	D083

CAPACITORS

Mark	Part No.	Symbol & Description
	CKDYF 473Z 50	C081
	CEA 101M 16	C082

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Descripton
★	RCP-190	V081 Semi-fixed 3.3k-B
	RD1/6PM □□□J	R083 – R085
	RD1/4PM □□□J	R086

REC Detector Assembly

SWITCH

Mark	Part No.	Symbol & Description
★★	RSG-143	S083 Push switch

Operation Switch Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★	1S2473	D1001 – D1004
★	BG5524S-1C5	D1005, D1006, D1008, D1011 – D1013
★	AA5524S-1C5	D1007
★	PR5524S-1C5	D1009, D1010
★	AA3422S-1C5	D1014, D1015

SWITCHES

Mark	Part No.	Symbol & Description
★★	RSG-155	S1001, S1004, S1007 Push switch
★★	RSG-143	S1002, S1003, S1005, S1006, S1008 – S1012 Push switch
★★	RSG-149	S1013 – S1015 Push switch

CAPACITOR

Mark	Part No.	Symbol & Description
	CEA 010M 50	C1001

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Description
	RD1/4PM □□□J	R1001 – R1017

Timer Switch Assembly

SWITCH

Mark	Part No.	Symbol & Description
★★	RSH-064	S1201 Slide switch

Eject Switch Assembly

SWITCH

Mark	Part No.	Symbol & Description
★★	RSG-143	S1301 Push switch

Transistor A Assembly

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
⚠★★	2SD1406	Q1401

Transistor B Assembly

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
⚠★★	2SD1406	Q1501

Tape Selector Assembly

SWITCHES

Mark	Part No.	Symbol & Description
★★	RSH-070	S081, S082 Slide switch

Cassette Half Sensor Assembly

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
★	GP-3S20	D081

Rotation Sensor Assembly

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
★	GP-1S03	D082

Power Supply Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	BA6109	Q801, Q802
★★	2SC17040LN	Q803
★★	2SA933LN	Q804, Q805
★★	2SD1189	Q806
⚠ ★	1B2C1-LC2	D801, D803, D812
⚠ ★	1B2Z1-LC2	D802, D804, D813
★	1S2473	D805, D806
⚠ ★	1SR35-100A	D809, D811
⚠ ★	RD5 . 6EB2	D808
⚠ ★	RD5.1EB2 (RD5.1EB3)	D810
⚠ ★	RD27FB1	D814
⚠ ★	RD6.2FB2	D815

SWITCH

Mark	Part No.	Symbol & Description
⚠ ★★	RSA-063	S801 Push switch (POWER)

COIL

Mark	Part No.	Symbol & Description
	RTF-160	L801 Line coil

CAPACITORS

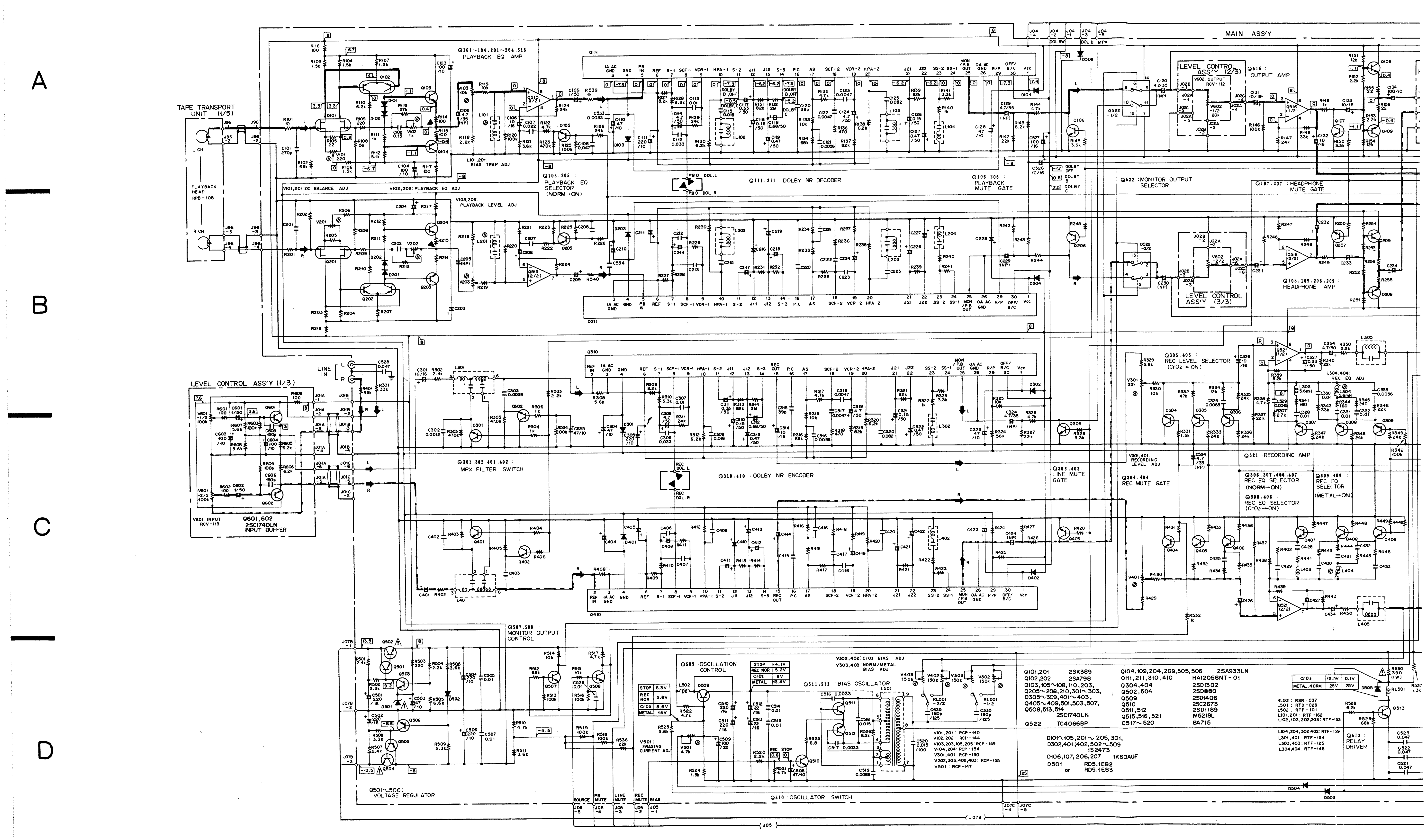
Mark	Part No.	Symbol & Description
	CEA 332M 25	C802, C803, C804
	CEA 471M 50	C816
	RCH-055 (RCH-056)	C808 Electrolytic (10000/25)
⚠	RCG-008	C801 Ceramic (0.01/AC250V)
	CEA 220M 25	C821
	CEA 330M 16	C815
	CEA 101M 10	C805, C806, C809
	CEA R22M 50	C814
	CEA 221M 35	C817
	CKDYF 103Z 50	C807, C810, C812, C819, C823
	CKDYF 473Z 50	C811
	CEA 101M 35	C818
	CEA 470M 25	C820
	CEANP 4R7M 35	C813

RESISTORS

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

Mark	Part No.	Symbol & Description
⚠	RS1LF □□□J	R801, R802, R807, R808, R811
	RD1/2PS 102J	R814
	RD1/4PM □□□J	Other resistors

10. SCHEMATIC DIAGRAM


1
2
3
4
5
6
A
B
C
D
MAIN ASS'Y
TAPE TRANSPORT UNIT (1/5)
L CH
R CH
PLAYBACK HEAD RPB-108
Q101~104,201~204,515 : PLAYBACK EQ AMP
L101,201 : BIAS TRAP ADJ
V101,201 : DC BALANCE ADJ
V102,202 : PLAYBACK EQ ADJ
V103,203 : PLAYBACK LEVEL ADJ
Q105,205 : PLAYBACK EQ SELECTOR (NORM→ON)
Q111,211 : DOLBY NR DECODER
PBO DOL.L
PBO DOL.R
Q106,206 : PLAYBACK MUTE GATE
DOLBY OFF
DOLBY B
DOLBY C
LEVEL CONTROL ASS'Y (2/3)
V602 : OUTPUT RCV-112
Q516 : OUTPUT AMP
Q522 : MONITOR OUTPUT SELECTOR
Q107,207 : HEADPHONE MUTE GATE
Q108,109,208,209 : HEADPHONE AMP
LEVEL CONTROL ASS'Y (3/3)
LINE IN
LEVEL CONTROL ASS'Y (1/3)
V601 : INPUT RCV-113
Q601,602 2SC1740LN INPUT BUFFER
Q301,302,401,402 : MPX FILTER SWITCH
Q310,410 : DOLBY NR ENCODER
REC DOL.L
REC DOL.R
Q303,403 : LINE MUTE GATE
Q304,404 : REC MUTE GATE
V301,401 : RECORDING LEVEL ADJ
Q305,405 : REC LEVEL SELECTOR (CrO2→ON)
L304,404 : REC EQ ADJ
Q521 : RECORDING AMP
Q306,307,406,407 : REC EQ SELECTOR (NORM→ON)
Q308,408 : REC EQ SELECTOR (CrO2→ON)
Q309,409 : REC EQ SELECTOR (METAL→ON)
Q501~506 : VOLTAGE REGULATOR
Q507,508 : MONITOR OUTPUT CONTROL
Q509 : OSCILLATION CONTROL
STOP 6.3V
REC NOR 5.8V
CrO2 8.6V
METAL 14V
STOP 14.1V
REC NOR 5.2V
CrO2 8V
METAL 13.4V
V501 : ERASING CURRENT ADJ
REC STOP 0.8 0
Q511,512 : BIAS OSCILLATOR
V302,402 : CrO2 BIAS ADJ
V303,403 : NORM/METAL BIAS ADJ
Q510 : OSCILLATOR SWITCH
SOURCE J05-5
PB MUTE J05-4
LINE MUTE J05-3
REC MUTE J05-2
BIAS J05-1
J05
J07B
J07C-4
J07C-5
Q513 : RELAY DRIVER
CrO2 12.5V 0.1V
METAL, NORM 25V 25V
Q101,201 2SK389
Q102,202 2SA798
Q103,105~108,110,203, Q205~208,210,301~303, Q305~309,401~403, Q405~409,501,503,507, Q508,513,514 2SC1740LN
Q522 TC4066BP
Q104,109,204,209,505,506 2SA933LN
Q111,211,310,410 HA12058NT-01
Q304,404 2SD1302
Q502,504 2SD880
Q509 2SD1406
Q510 2SC2673
Q511,512 2SD1189
Q515,516,521 M5218L
Q517~520 BA715
D101~105,201~205,301, D302,401,402,502~509 1S2473
D106,107,206,207 1K60AUF
D501 RD5.1EB2 or RD5.1EB3
V101,201 : RCP-140
V102,202 : RCP-144
V103,203,105,205 : RCP-149
V104,204 : RCP-154
V301,401 : RCP-150
V302,303,402,403 : RCP-155
V501 : RCP-147
RL501 : RSR-037
L501 : RTD-029
L502 : RTF-101
L101,201 : RTF-162
L102,103,202,203 : RTF-53
L104,204,302,402 : RTF-159
L301,401 : RTF-154
L303,403 : RTF-125
L304,404 : RTF-148

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

1. RESISTORS.
   Indicated in Ω, ¼W, ⅛ W,±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE CURRENT.
   ▭ ; DC voltage (V) at no input signal
4. OTHERS:
   ➡ ; Signal route.
   ⊘ ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts numbers.

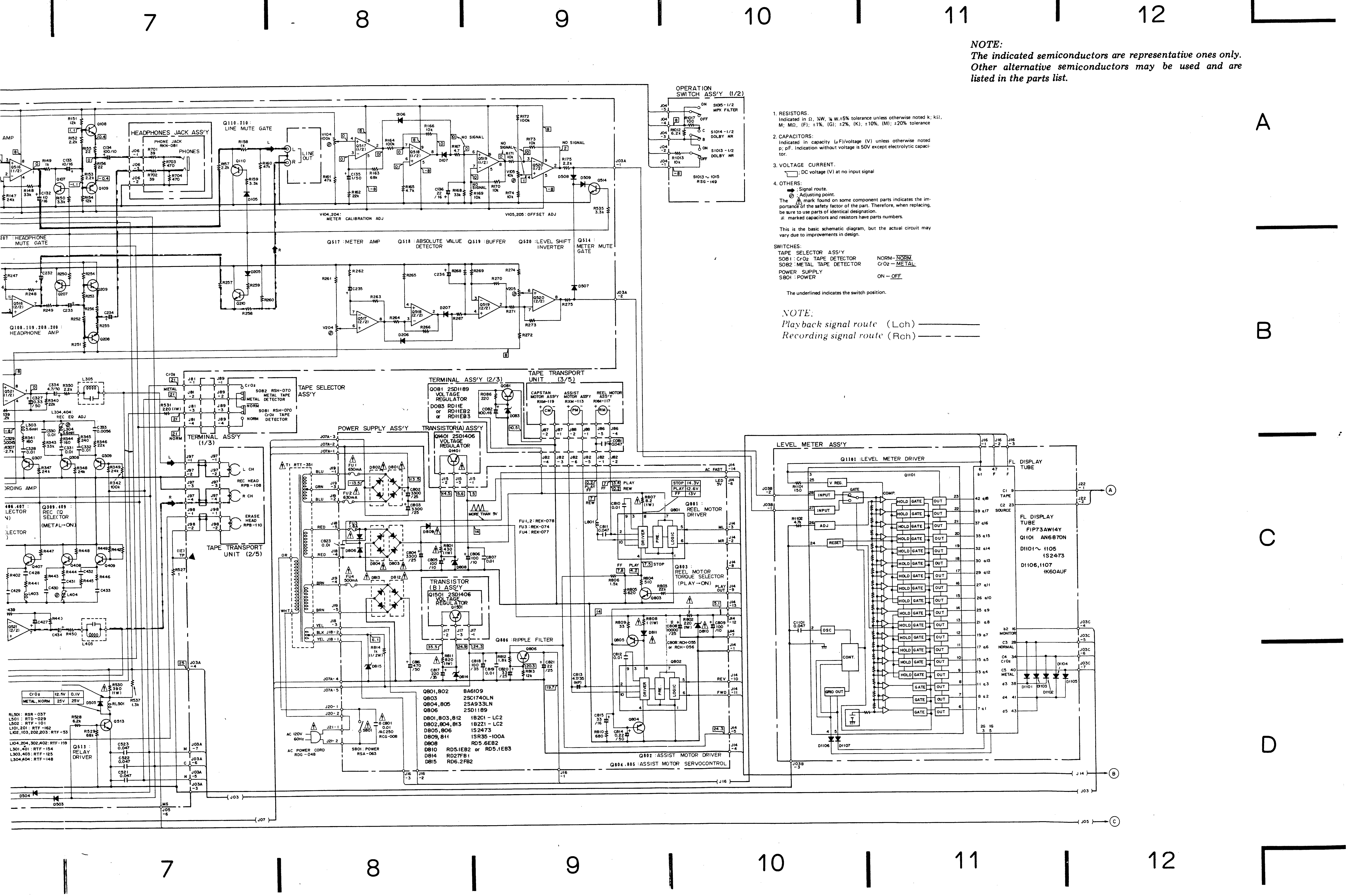
   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:

TAPE SELECTOR ASS'Y	
S081 : CrO2 TAPE DETECTOR	NORM–NORM
S082 : METAL TAPE DETECTOR	CrO2 – METAL
POWER SUPPLY	
S801 : POWER	ON – OFF

The underlined indicates the switch position.

NOTE;
Playback signal route (Lch) ————
Recording signal route (Rch) —— – ——



7
8
9
10
11
12
A
B
C
D
OPERATION SWITCH ASS'Y (1/2)
S1015-1/2 MPX FILTER
S1014-1/2 DOLBY NR
S1013-1/2 DOLBY NR
S1013～1015 RSG-149
HEADPHONES JACK ASS'Y
PHONE JACK RKN-081
PHONES
Q110.210 : LINE MUTE GATE
LINE OUT
V104,204 : METER CALIBRATION ADJ
V105,205 : OFFSET ADJ
Q517 : METER AMP
Q518 : ABSOLUTE VALUE DETECTOR
Q519 : BUFFER
Q520 : LEVEL SHIFT INVERTER
Q514 : METER MUTE GATE
NO SIGNAL
207 : HEADPHONE MUTE GATE
Q108.109.208.209 : HEADPHONE AMP
TAPE SELECTOR ASS'Y
S082 RSH-070 METAL TAPE DETECTOR
S081 RSH-070 CrO2 TAPE DETECTOR
TERMINAL ASS'Y (1/3)
REC HEAD RPB-108
ERASE HEAD RPB-110
TAPE TRANSPORT UNIT (2/5)
L304,404 : REC EQ ADJ
Q309.409 : REC EQ SELECTOR (METAL→ON)
RECORDING AMP
TERMINAL ASS'Y (2/3)
Q081 2SD1189 VOLTAGE REGULATOR
D083 RD11E or RD11EB2 or RD11EB3
TAPE TRANSPORT UNIT (3/5)
CAPSTAN MOTOR ASS'Y RXM-119
ASSIST MOTOR ASS'Y RXM-113
REEL MOTOR ASS'Y RXM-117
POWER SUPPLY ASS'Y
TRANSISTOR(A) ASS'Y
Q1401 2SD1406 VOLTAGE REGULATOR
TRANSISTOR (B) ASS'Y
Q1501 2SD1406 VOLTAGE REGULATOR
T1 RTT-351
FU1 630mA
FU2 630mA
FU3 1.6A
FU4 500mA
FU1,2 : REK-078
FU3 : REK-074
FU4 : REK-077
Q806 : RIPPLE FILTER
Q801 : REEL MOTOR DRIVER
Q803 : REEL MOTOR TORQUE SELECTOR (PLAY→ON)
C808 : RCH-055 or RCH-056
Q802 : ASSIST MOTOR DRIVER
Q804.805 : ASSIST MOTOR SERVOCONTROL
Q801,802 BA6109
Q803 2SC1740LN
Q804,805 2SA933LN
Q806 2SD1189
D801,803,812 1B2C1-LC2
D802,804,813 1B2Z1-LC2
D805,806 1S2473
D809,811 1SR35-100A
D808 RD5.6EB2
D810 RD5.1EB2 or RD5.1EB3
D814 RD27FB1
D815 RD6.2FB2
AC 120V 60Hz
AC POWER CORD RDG-048
S801 : POWER RSA-063
C801 0.01 AC250 RCG-008
LEVEL METER ASS'Y
Q1101 : LEVEL METER DRIVER
FL DISPLAY TUBE
FL DISPLAY TUBE FIP73AW14Y
Q1101 AN6870N
D1101～1105 1S2473
D1106,1107 1K60AUF
HOLD GATE
OUT
GATE
V REG.
INPUT
ADJ
RESET
OSC
CONT.
GRID OUT
TAPE
SOURCE
MONITOR
NORMAL
CrO2
METAL
Q513 : RELAY DRIVER
RL501 : RSR-037
L501 : RTD-029
L502 : RTF-101
L101,201 : RTF-162
L102,103,202,203 : RTF-53
L104,204,302,402 : RTF-159
L301,401 : RTF-154
L303,403 : RTF-125
L304,404 : RTF-148
CrO2 12.5V 0.1V
METAL,NORM 25V 25V

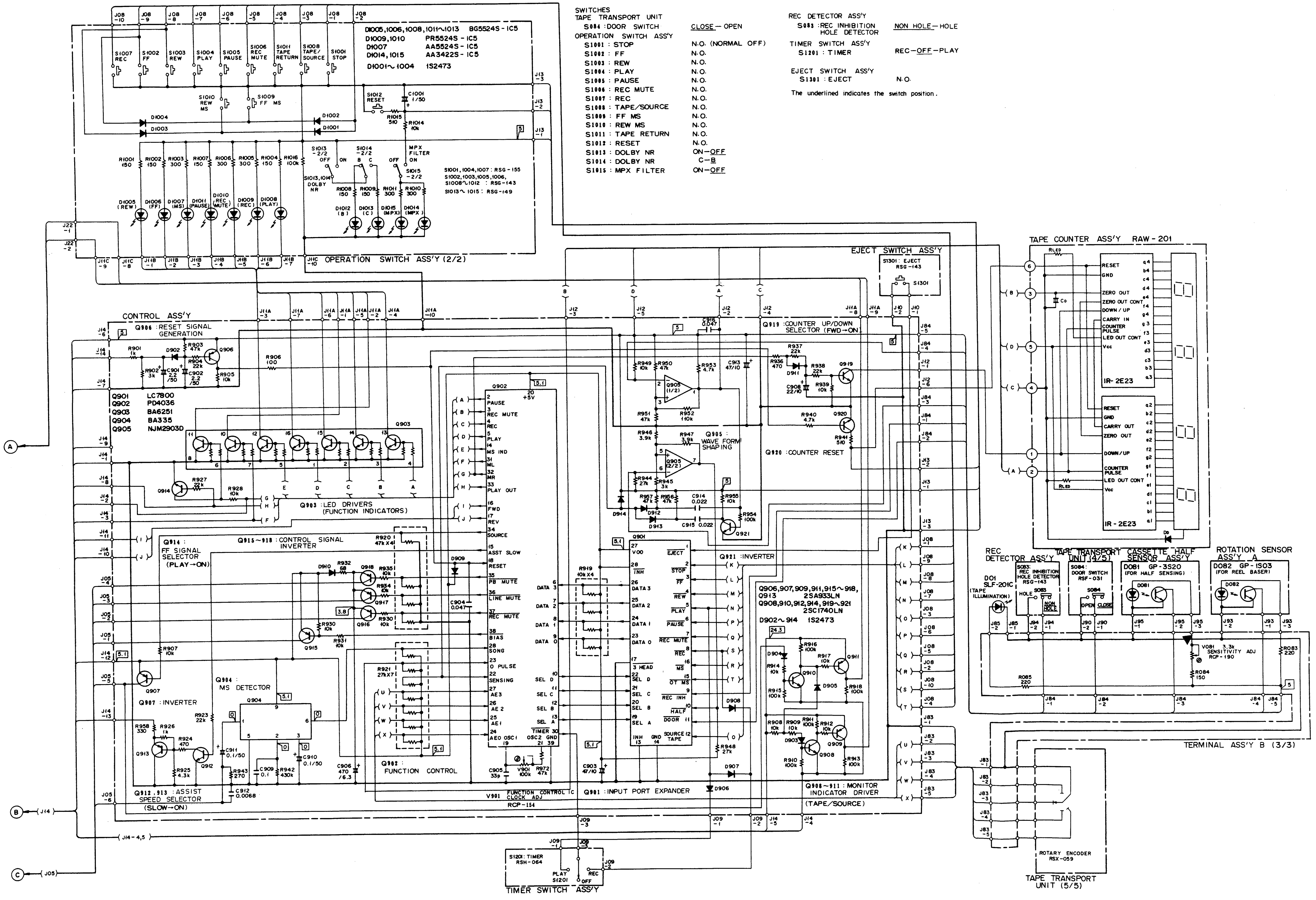
1 2 3 4 5 6

A

B

C

D


D1005,1006,1008,1011~1013 BG5524S-IC5
D1009,1010 PR5524S-IC5
D1007 AA5524S-IC5
D1014,1015 AA3422S-IC5
D1001~1004 1S2473
S1001,1004,1007 : RSG-155
S1002,1003,1005,1006, S1008~1012 : RSG-143
S1013~1015 : RSG-149
OPERATION SWITCH ASS'Y (2/2)
CONTROL ASS'Y
Q906 :RESET SIGNAL GENERATION
Q901 LC7800
Q902 PD4036
Q903 BA6251
Q904 BA335
Q905 NJM2903D
Q903 :LED DRIVERS (FUNCTION INDICATORS)
Q914 : FF SIGNAL SELECTOR (PLAY→ON)
Q915~918 :CONTROL SIGNAL INVERTER
Q907 :INVERTER
Q904 : MS DETECTOR
Q912,913 :ASSIST SPEED SELECTOR (SLOW→ON)
Q902 : FUNCTION CONTROL
V901 FUNCTION CONTROL IC CLOCK ADJ RCP-154
Q901 :INPUT PORT EXPANDER
Q919 :COUNTER UP/DOWN SELECTOR (FWD→ON)
Q905 : WAVE FORM SHAPING
Q920 :COUNTER RESET
Q921 :INVERTER
Q906,907,909,911,915~918, Q913 2SA933LN
Q908,910,912,914,919~921 2SC1740LN
D902~914 1S2473
Q908~911 : MONITOR INDICATOR DRIVER (TAPE/SOURCE)
EJECT SWITCH ASS'Y
S1301: EJECT RSG-143
TAPE COUNTER ASS'Y RAW-201
IR-2E23
REC DETECTOR ASS'Y
TAPE TRANSPORT UNIT(4/5)
CASSETTE HALF SENSOR ASS'Y
D081 GP-3S20 (FOR HALF SENSING)
ROTATION SENSOR ASS'Y A
D082 GP-1S03 (FOR REEL BASER)
D01 SLF-201C (TAPE ILLUMINATION)
S083: REC INHIBITION HOLE DETECTOR RSG-143
S084: DOOR SWITCH RSF-031
VR081 3.3k SENSITIVITY ADJ RCP-190
TERMINAL ASS'Y B (3/3)
ROTARY ENCODER RSX-059
TAPE TRANSPORT UNIT (5/5)
S1201: TIMER RSH-064
TIMER SWITCH ASS'Y

SWITCHES
TAPE TRANSPORT UNIT
S084 :DOOR SWITCH CLOSE—OPEN
OPERATION SWITCH ASS'Y
S1001 : STOP N.O. (NORMAL OFF)
S1002 : FF N.O.
S1003 : REW N.O.
S1004 : PLAY N.O.
S1005 : PAUSE N.O.
S1006 : REC MUTE N.O.
S1007 : REC N.O.
S1008 : TAPE/SOURCE N.O.
S1009 : FF MS N.O.
S1010 : REW MS N.O.
S1011 : TAPE RETURN N.O.
S1012 : RESET N.O.
S1013 : DOLBY NR ON—OFF
S1014 : DOLBY NR C—B
S1015 : MPX FILTER ON—OFF

REC DETECTOR ASS'Y
S083 :REC INHIBITION HOLE DETECTOR NON HOLE—HOLE
TIMER SWITCH ASS'Y
S1201 : TIMER REC—OFF—PLAY

EJECT SWITCH ASS'Y
S1301 : EJECT N.O.

The underlined indicates the switch position.

1 2 3 4 5 6

11. ADJUSTMENTS

11.1 MECHANICAL ADJUSTMENTS

11.1.1 Tape Speed Adjustment

*Use a frequency counter

Mode	Adjustment location	Specifications
PLAY	Variable resistor in the capstan motor adjustment hole	Playback frequency should be within the 3005 ±10Hz range at the beginning of the STD-301 test tape.
PLAY	Check	Playback frequency should be within the 3000 ±30Hz range at the beginning of the STD-301 test tape.

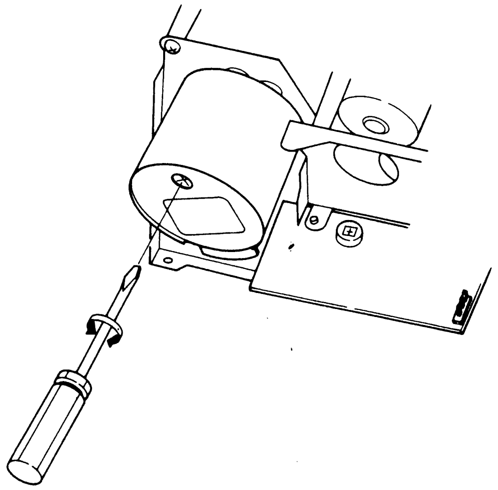
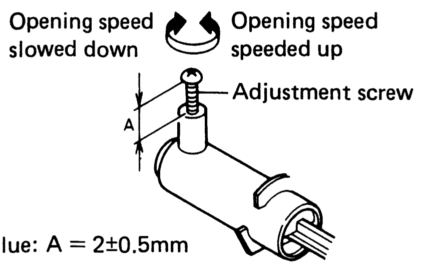


Fig. 11-1 Tape speed adjustment

11.1.2 Air Damper Adjustment

Adjustment location	Specifications
Cylinder adjustment screw	The door should open smoothly (with no jerking etc.), and should not "bounce" back when fully opened.



Reference value: A = 2±0.5mm

Fig. 11-2 Air damper adjustment

11.1.3 Door Position Adjustment

Check 1	When seen from the front, the ratios between dimensions A and B, and between dimentions C and D should be within the 0.5 to 2 range.
Check 2	When seen from the front, the difference between E and G should not exceed ±0.4mm, and E, F, and G should all exceed 0.5mm.
If the above specifications are not met, loosen the screws and readjust the door position.	

Standard A:B:C:D = 1:1:1:1.25

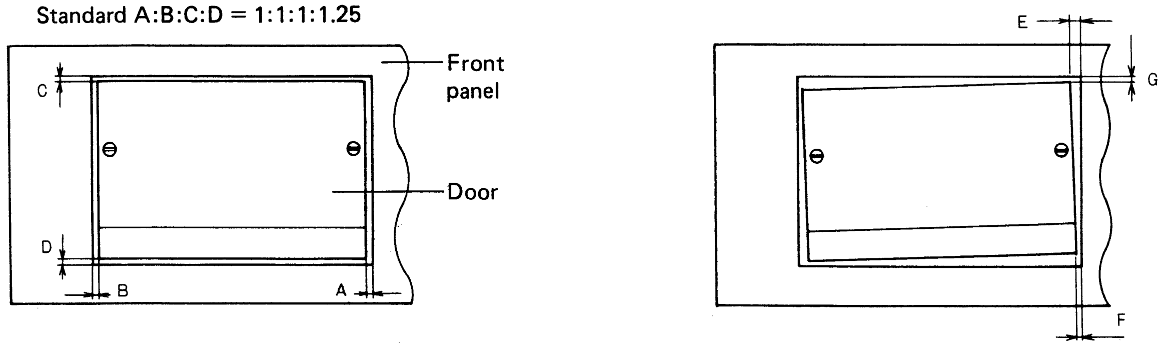


Fig. 11-3 Door position adjustment

11.2 ELECTRICAL ADJUSTMENTS

Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The heads must be cleaned and demagnetized.
3. Allow the deck to age for at least a few minutes before commencing any electrical adjustments.
4. The reference signal level is 0dBv = 1Vrms.
5. Connect a 50 kilo-ohm (or between 47 to 52 kilo-ohm) load resistance to the OUTPUT terminals.
6. Unless otherwise specified, leave the OUTPUT level control at the position of maximum level.
7. Likewise, the other switches listed below are to be left in the positions indicated unless otherwise specified.
   TIMER : OFF
   DOLBY NR : OFF
   MPX FILTER : OFF

Test Tapes

STD-331B* : Playback adjustments (See Fig. 11-4)
STD-608A : NORMAL blank tape
STD-603 : CrO_2 blank tape
STD-604 : METAL blank tape

* Whereas the reference recording level for STD-331A is 333Hz, 250nwb/m, the same level for STD-331B is 315Hz, 160nwb/m.

List of Adjustments

1. DC amplifier DC balance adjustment
2. Control IC clock adjustment
3. Cassette half detector sensitivity adjustment
4. Tape transport and head azimuth adjustment
5. Playback equalizer adjustment
6. Playback level adjustment
7. Level meter adjustment
8. METAL erasure current adjustment
9. Bias trap adjustment
10. Recording bias adjustment
11. Recording level adjustment
12. Recording and playback frequency response adjustment

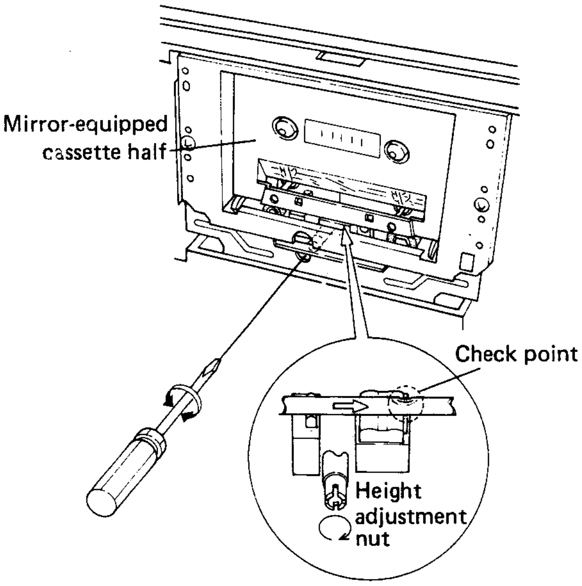

Mirror-equipped cassette half
Check point
Height adjustment nut

Fig. 11-5 Tape transport adjustment

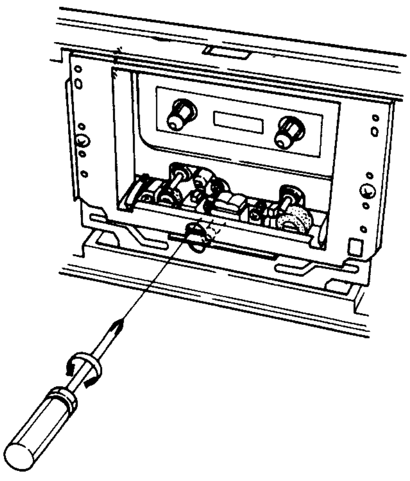


Fig. 11-6 Head azimuth adjustment

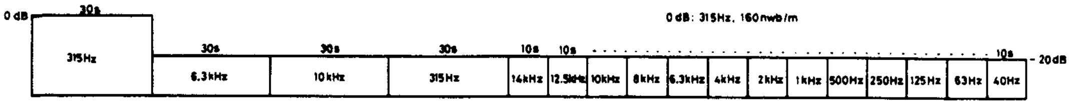

0 dB
30s
315Hz
0 dB: 315Hz, 160nwb/m
30s
6.3kHz
30s
10kHz
30s
315Hz
10s
14kHz
10s
12.5kHz
10kHz
8kHz
6.3kHz
4kHz
2kHz
1kHz
500Hz
250Hz
125Hz
63Hz
10s
40Hz
-20dB

Fig. 11-4 STD-331B test tape

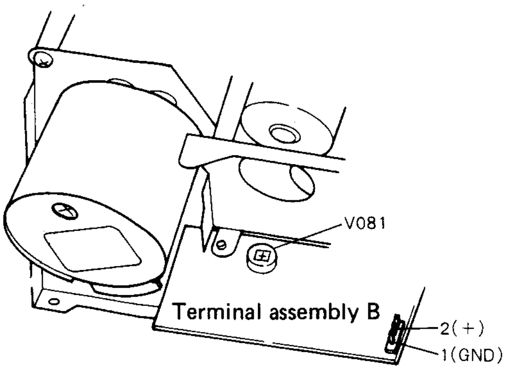

V081
Terminal assembly B
2(+)
1(GND)

Fig. 11-7 Cassette half detector sensitivity adjustment

Test tape	STD-331B
DOLBY NR switch	OFF

* The right channel is compensated by −1dB from the actual measurements at 40Hz and 63Hz.

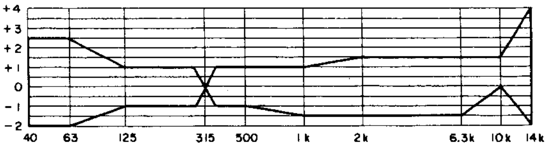


Fig. 11-8 Allowable playback frequency response zone

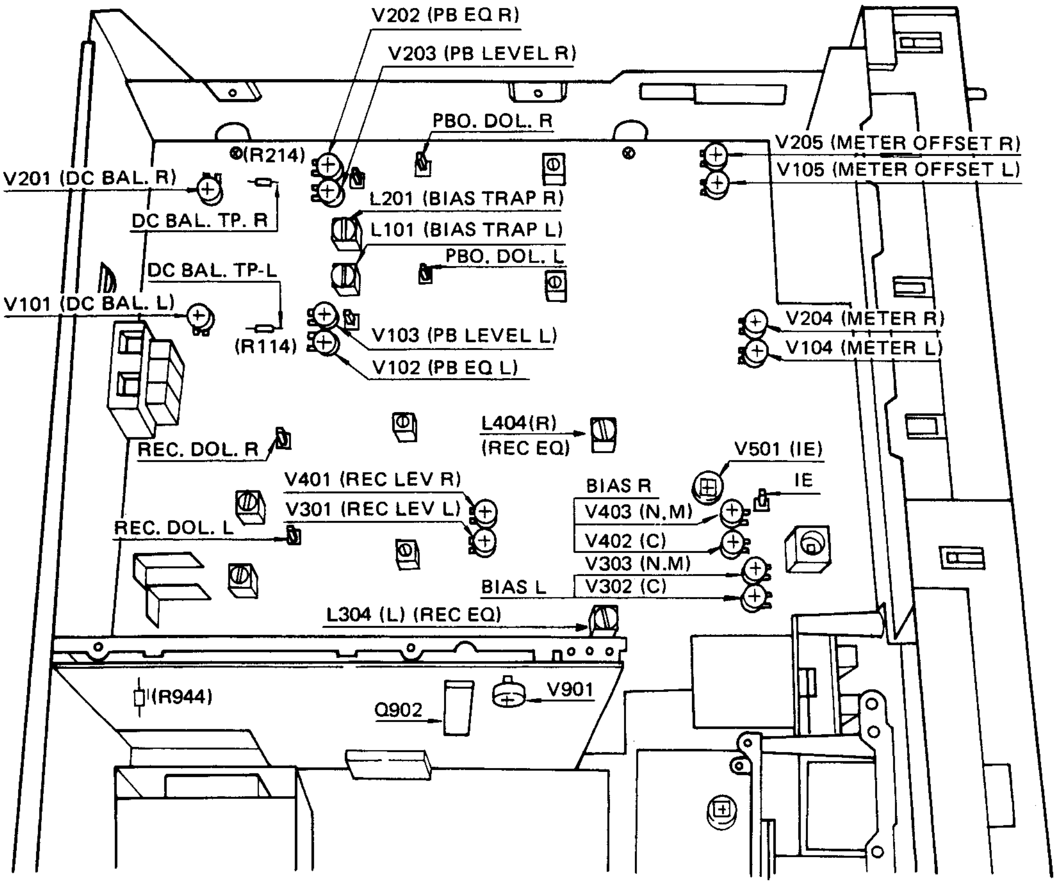

V202 (PB EQ R)
V203 (PB LEVEL R)
PBO. DOL. R
⊗(R214)
V201 (DC BAL. R)
L201 (BIAS TRAP R)
DC BAL. TP. R
L101 (BIAS TRAP L)
PBO. DOL. L
DC BAL. TP-L
V101 (DC BAL. L)
V103 (PB LEVEL L)
(R114)
V102 (PB EQ L)
V205 (METER OFFSET R)
V105 (METER OFFSET L)
V204 (METER R)
V104 (METER L)
L404(R)
(REC EQ)
REC. DOL. R
V501 (IE)
V401 (REC LEV R)
BIAS R
IE
V301 (REC LEV L)
V403 (N.M)
REC. DOL. L
V402 (C)
V303 (N.M)
BIAS L
V302 (C)
L304 (L) (REC EQ)
(R944)
Q902
V901

Fig. 11-9 Adjustment locations

1. DC Amplifier DC Balance Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	No input	V101 (left channel)	DC.BAL.TP-L	0±0.2V DC	Measure at the R114 lead facing the front panel
2			V201 (right channel)	DC.BAL.TP-R	0±0.2V DC	Measure at the R214 lead facing the front panel

2. Control IC Clock Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	STOP	No input	V901 (Control assembly)	Pin 21 of Q902 (Control assembly)	200kHz±5kHz	Insert a capacitor of a few pF and measure by frequency counter.

3. Cassette Half Detector Sensitivity

- Measure with a DC voltmeter of high input impedance (of about 1 Mega-ohm).
- Connect 5.1 kilo-ohm in parallel with R944 in the control assembly for the adjustment, and remove it after the adjustment has been completed.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	STOP	No input (cassette half not inserted)	V081 (see Fig. 11-7) (Terminal assembly B)	Between 2(+) and 1 (Terminal assebmly B)	2.5V±0.1V DC	Prevent strong illumination being beamed onto the photo-interrupter

4. Tape Transport and Head Azimuth Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	PLAY	Mirror-equipped cassette half	Height adjustment nut (see Fig. 11-5)	Tape guide (see Fig. 11-5)	No tape curling at the tape guide	Tape curling and floating up to 1/5 of the tape width is permissible
2	PLAY	Play the 10kHz/–20dB section of the STD-331B test tape	Head azimuth adjustment screw (see Fig. 11-6)	Left and right OUTPUT terminals	Zero phase difference between left and right channels at maximum playback signal level (playback level fluctuation 1.0dB max.)	
3	Check step 1, and readjust if necessary. Always perform step 2 after performing step 1.					

5. Playback Equalizer Adjustment

- Set V103 and V203 (playback level ADJ.) to maximum level, and V102 and V202 (playback EQ.ADJ.) to the mechanical center positions.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	PLAY	Play the 315Hz/–20dB and 10kHz/–20dB sections of the STD-331B test tape	V102 (left channel) V202 (right channel)	Left and right OUTPUT terminals	Playback level at 10kHz to be +0.5 dB higher than the playback level at 315Hz	Check that the frequency response lies inside the allowable playback frequency response zone (see Fig. 11-8)

6. Playback Level Adjustment

- This adjustment must be performed accurately since it also sets the Dolby NR level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	PLAY	Play the 315Hz/0dB section of the STD-331B test tape	V103 (left channel) V203 (right channel)	PBO.DOL.L PBO.DOL.R	–7.7dBv (412.1mV)	Leave the DOLBY NR switch off.

7. Level Meter Adjustment

- Set V104, V105, V204, and V205 to maximum positions, and OUTPUT level control to maximum level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Apply a 315Hz/−10dBv (316mV) signal to the INPUT terminals	INPUT level control	REC.DOL.L REC.DOL.R	−7.7dBv (412.1mV)	
2		Set the input signal level to −35dBv (17.8mV)	Set the MONITOR switch to the SOURCE position			
3			V105 (left channel) V205 (right channel)	Turn slowly counter-clockwise and stop when the "−20dB" segments go out.		
4		Set the input signal level to −10dBv (316mV)	Set the MONITOR switch to the SOURCE position			
5			V104 (left channel) V204 (right channel)	After turning fully counter-clockwise, turn back clockwise until the "0dB" segments come on.		
6		Switch the input signal off when the "0dB" segments are on, and check that when the "−20dB" segment for one channel gose out the "discrepancy in the residual display" in the other channel is not more than two segments ("−20dB" or "−15dB").				
7		Vary the input signal level	Check	Meter display +10dB	Comes on at input level of 0±3dBv	
8			Check	Meter display −10dB	Comes on at input level of −20±3dBv	

8. METAL Erasure Current Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	REC	No input, STD-604 test tape	V501	IE-GND	175mV AC	

9. Bias Trap Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	REC	No input, STD-604 test tape	L101 (left channel) L201 (right channel)	PB.DOL.L PB.DOL.R	Minimum bias leak	Measure with AC voltmeter and oscilloscope

10. Recording Bias Adjustment

- Set the MONITOR switch to the SOURCE position, and adjust the OUTPUT level control to maximum level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 6.3kHz/−20dBv (100mV) signal to the INPUT terminals	INPUT level control	Left and right OUTPUT terminals	−14dBv (199.5mV)	−10VU recording
2	REC	Record the above signal onto the STD-608A test tape, and monitor playback simultaneously	V303 (left channel) V403 (right channel)	Left and right OUTPUT terminals (and MONITOR in the TAPE position	After first turning V303 and V403 fully counter-clockwise, turn back clockwise and stop at a position where the level drops 3dB below the maximum playback level after passing through that maximum level position.	
3	REC	Record the above signal onto the STD-603 test tape, and monitor playback simultaneously	V302 (left channel) V402 (right channel)		After first turning V302 and V402 fully counter-clockwise, turn back clockwise and stop at a position where the level drops 2.5dB below the maximum playback level after passing through that maximum level position.	

11. Recording Level Adjustment

- Leave the DOLBY NR switch off.

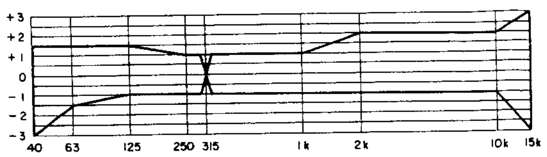
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 315Hz/–10dBv (316mV) signal to the INPUT terminals	INPUT level control	REC.DOL.L REC.DOL.R	–7.7dBv (412.1mV)	
2	REC	Record the avove signal onto the STD-608A test tape, and monitor playback simultaneously	V301 (left channel) V401 (right channel)	PBO.DOL.L PBO.DOL.R	–7.7dBv (412.1mV)	
3	REC	Record the above signal onto the STD-603 and STD-604 test tapes, and monitor playback simultaneously	Check	PBO.DOL.L PBO.DOL.R	–7.7±1.5dBv	

12. Recording and Playback Frequency Response Adjustment

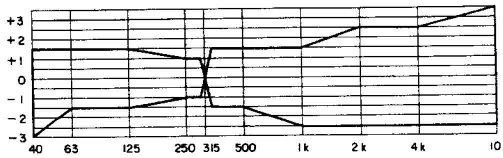
- Levae the DOLBY NR switch off, and set the OUTPUT level control to maximum level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 315Hz/–30dBv (31.6mV) signal to the INPUT terminals	INPUT level control	Left and right OUTPUT terminals	–24dBv (63.1mV)	
2	REC	Record the above signal level onto the STD-608A test tape at 315Hz and 10kHz, and monitor playback simultaneously	V303 (left channel) V403 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to 0dB higher than the 315Hz level (with MONITOR switch in TAPE position).	
3	Record and playback signals up to 15kHz onto the STD-608A test tape, and check that the allowable frequency response zone shown in Fig. 11-10 is satisfied (for DOLBY NR OFF, and B and C).					
4	REC	Likewise, record and playback the same signal onto the STD-604 test tape	L304 (left channel) L404 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to 0dB respect to the 315Hz level (with MONITOR switch in TAPE position).	
5	Record and playback signals up to 15kHz onto the STD-604 test tape, and check that the allowable frequency response zone shown in Fig. 11-12 is satisfied (for DOLBY NR OFF, and B and C).					
6	REC	Likewise, record and playback the same signal onto the STD-603 test tape	V302 (left channel) V402 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to 0dB in respect to the 315Hz level (with MONITOR switch in TAPE position).	
7	Record and playback signals up to 15kHz onto the STD-603 test tape, and check that the allowable frequency response zone shown in Fig. 11-11 is satisfied (for DOLBY NR OFF, and B and C).					

Test tape	STD-608A (NORM)
DOLBY NR switch	OFF



Test tape	STD-608A (NORM)
DOLBY NR switch	B type ON



Test tape	STD-608A (NORM)
DOLBY NR switch	C type ON

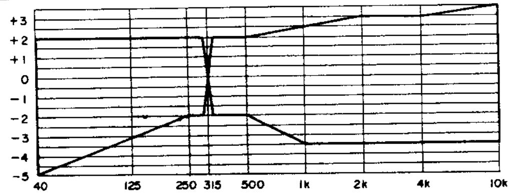
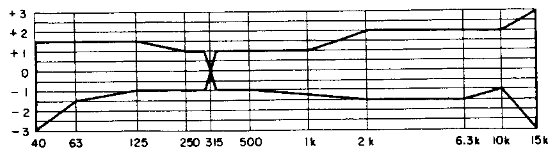
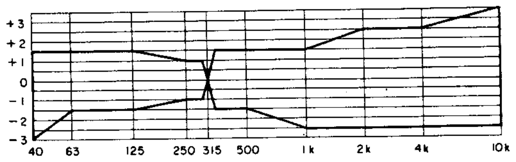


Fig. 11-10 Allowable recording and playback frequency response zone (NORM)

Test tape	STD-603 (CrO_2)
DOLBY NR switch	OFF



Test tape	STD-603 (CrO_2)
DOLBY NR switch	B type ON



Test tape	STD-603 (CrO_2)
DOLBY NR switch	C type ON

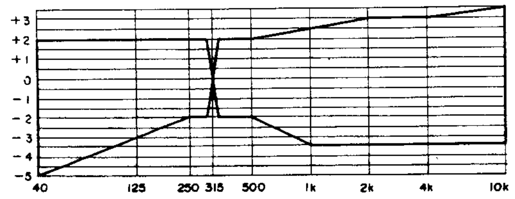
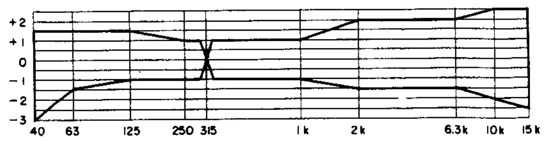
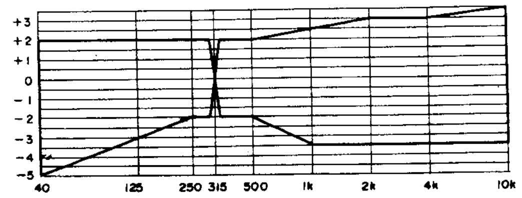


Fig. 11-11 Allowable recording and playback frequency response zone (CrO_2)

Test tape	STD-604
DOLBY NR switch	OFF



Test tape	STD-604
DOLBY NR switch	C type ON



Test tape	STD-604
DOLBY NR switch	B type ON

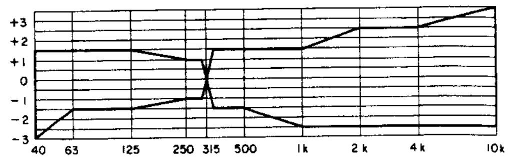


Fig. 11-12 Allowable recording and playback frequency response zone (METAL)

11. RÉGLAGE

11.1 REGLAGES MECANIQUES

11.1.1 Réglage de la vitesse de la bande

* Utiliser un fréquencemètre

Mode	Point du réglage	Spécifications
PLAY (reproduction)	Fhéostat dans l'orifice de réglage du moteur du cabestan	La fréquence de reproduction doit se situer dans une plage 3005 ± 10Hz au début de la bande d'essai STD-301.
PLAY	Vérification	La fréquence de reproduction doit se situer dans une plage 3000 ± 30Hz au début de la bande d'essai STD-301.

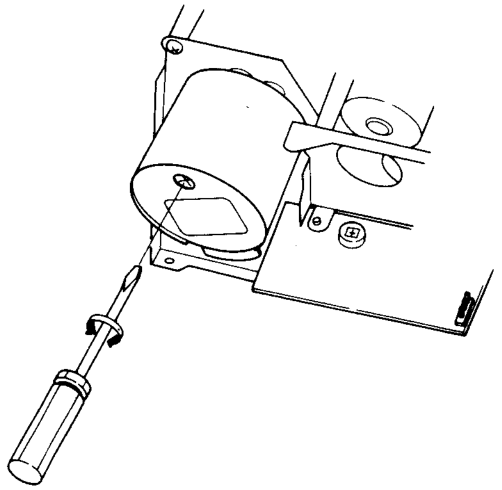
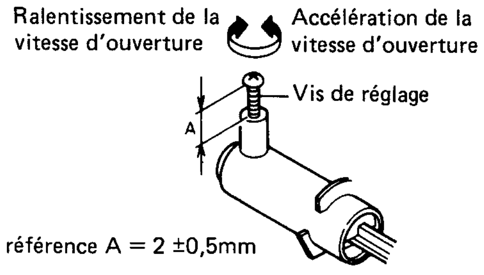


Fig. 11-1 Réglage de la vitesse de la bande

11.1.2 Réglage du clapet d'entrée d'air

Point du réglage	Spécifications
Vis de réglage du cylindre	La porte doit s'ouvrir en douceur (sans à-coups) et ne doit pas revenir d'un coup sec en arrière lorsqu'on l'ouvre à fond.


Ralentissement de la vitesse d'ouverture
Accélération de la vitesse d'ouverture
Vis de réglage
A

Valeur de référence A = 2 ±0,5mm

Fig. 11-2 Réglage du clapet d'entrée d'air

11.1.3 Réglage de la position de la porte

Point de réglage 1	Vu de face, les rapports entre les dimensions A et B, et entre les dimensions C et D doivent se situer entre 0,5 et 2.
Point de réglage 2	Vu de face, la différence entre E et G ne doit pas excéder ±0,4mm, et E, F, et G doivent toutes dépasser 0,5mm.
Si les spécifications ci-dessus ne sont respectées, desserre les vis et rerégler la position de la porte.	

Standard A : B : C : D = 1 : 1 : 1 : 1,25

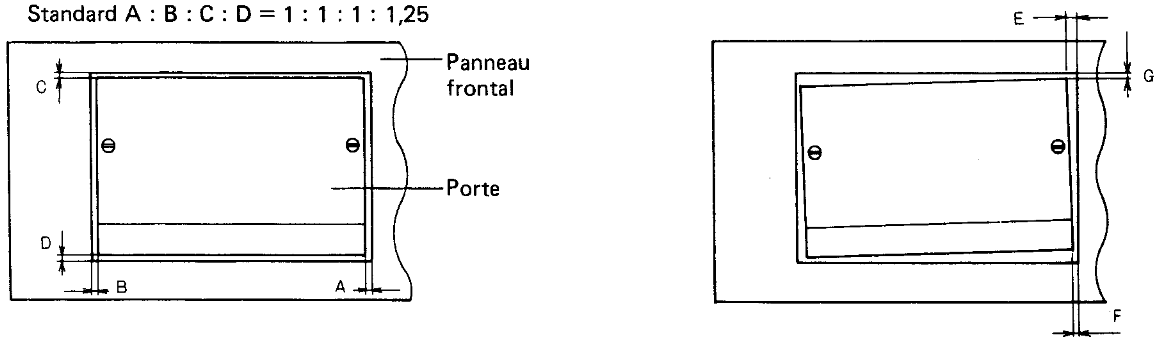


Fig. 11-3 Réglage de la position de la porte

11.2 REGLAGES ELECTRIQUES

Conditions de réglages

1. Les réglages mécaniques doit être d'abord terminés.
2. Les têtes doivent être nettoyées et démagnétisées.
3. Laisser chauffer la platine pendant quelques minutes au moins avant de commencer un quelconque réglage électrique.
4. Le niveau de référence du signal est 0dBv = 1V rms (efficace).
5. Brancher une résistance de charge de 50 kohm (ou entre 47 et 52 kohm) sur les bornes de sortie (OUTPUT).
6. Sauf spécification contraire, laisser le contrôle de niveau de sortie (OUTPUT) sur la position maximum.
7. De la même manière, les autres commutateurs cités cidessous doivent être laissés dans la position indiquée sauf spécification contraire.
   TIMER (minuteur) : OFF (arrêt)
   DOLBY NR : OFF (arrêt)
   FILTRE MPX : OFF (arrêt)

Bandes d'essai

STD-331B* : Réglages de reproduction (se référer à la Fig. 11-4).
STD-608A : Bande vierge NORMALE
STD-603 : Bande vierge à l'oxyde de chrome CrO₂
STD-604 : Bande vierge METAL

* Le niveau de référence d'enregistrement pour la STD-331A est 333Hz, 250nwb/m; pour la STD-331B, 315Hz, 160nwb/m.

Liste des réglages

1. Réglage de la balance DC de l'amplificateur DC.
2. Réglage de base du circuit intégré de commande.
3. Réglage de la sensibilité du détecteur de cassette.
4. Réglage de l'azimutage de la tête et du transport de la bande.
5. Réglage de l'égaliseur de reproduction.
6. Réglage du niveau de reproduction.
7. Réglage de l'indicateur de niveau.
8. Réglage du courant d'effacement METAL.
9. Réglage du circuit de polarisation.
10. Réglage de la polarisation d'enregistrement.
11. Réglage du niveau d'enregistrement.
12. Réglage de la réponse en fréquence et de reproduction.

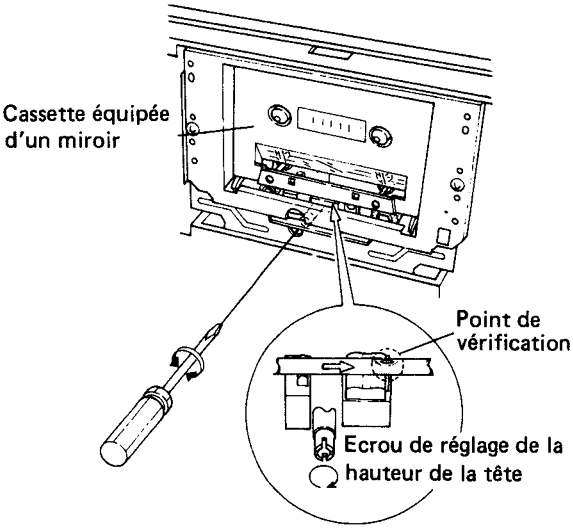

Cassette équipée d'un miroir
Point de vérification
Ecrou de réglage de la hauteur de la tête

Fig. 11-5 Réglage du transport de la bande

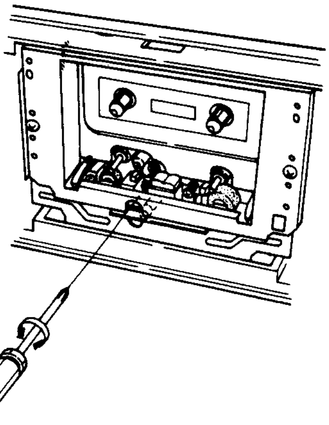


Fig. 11-6 Réglage de l'azimutage de la tête

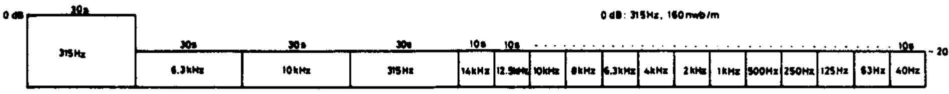

0 dB
30s
315Hz
30s
6.3kHz
30s
10kHz
30s
315Hz
10s
14kHz
10s
12.5kHz
10kHz
8kHz
6.3kHz
4kHz
2kHz
1kHz
500Hz
250Hz
125Hz
63Hz
10s
40Hz
-20dB
0 dB: 315Hz, 160nwb/m

Fig. 11-4 Bande d'essai STD-331B

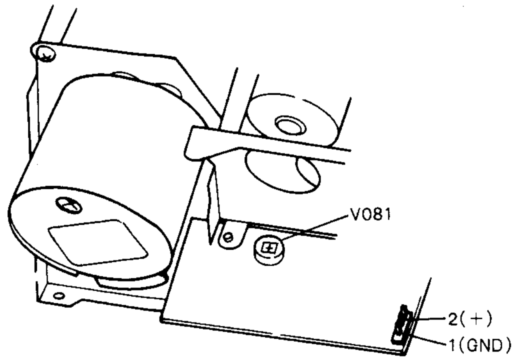


Fig. 11-7 Réglage de la sensibilité du détecteur de cassette

Bande d'essai	STD-331B´
Réducteur de bruit DOLBY	OFF (désenclenché)

* Le canal droit est pondéré de −1dB par rapport aux mesures réelles à 40 et 63Hz.

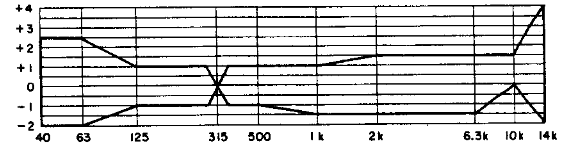


Fig. 11-8 Zone de réponse en fréquence de reproduction admissible

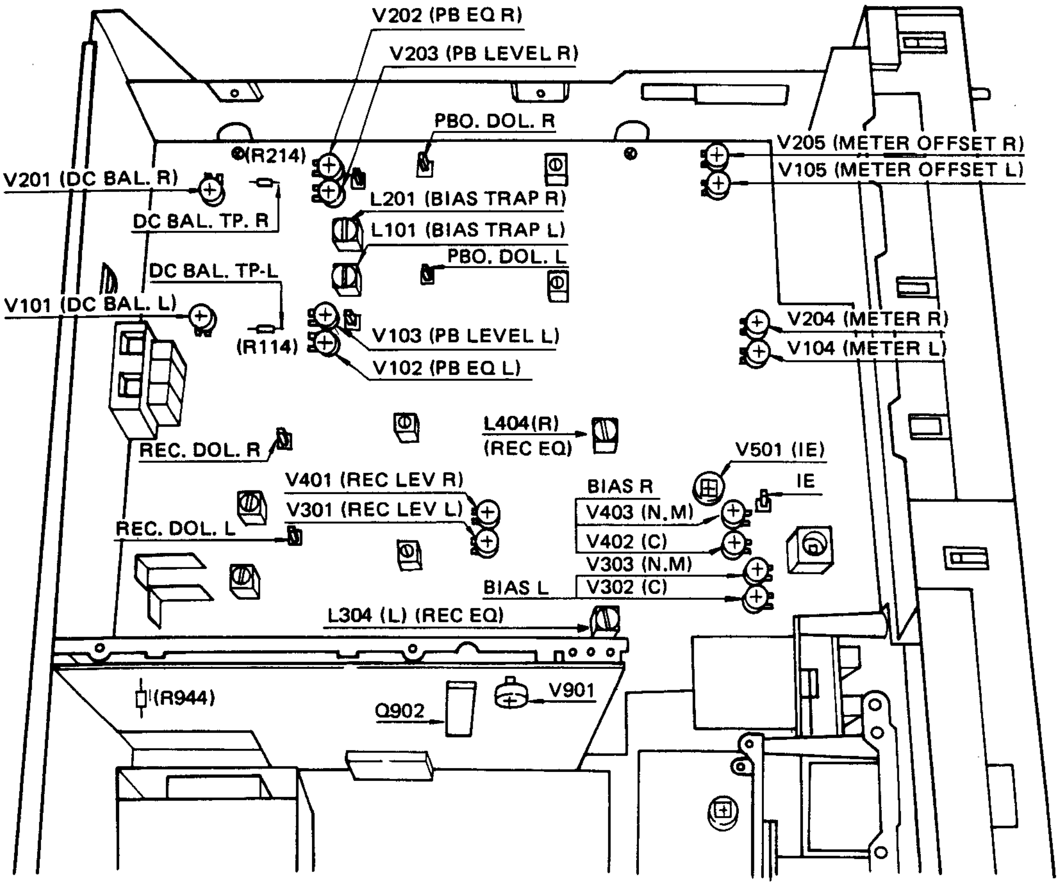

V202 (PB EQ R)
V203 (PB LEVEL R)
PBO. DOL. R
(R214)
V201 (DC BAL. R)
L201 (BIAS TRAP R)
DC BAL. TP. R
L101 (BIAS TRAP L)
PBO. DOL. L
DC BAL. TP-L
V101 (DC BAL. L)
(R114)
V103 (PB LEVEL L)
V102 (PB EQ L)
V205 (METER OFFSET R)
V105 (METER OFFSET L)
V204 (METER R)
V104 (METER L)
REC. DOL. R
L404(R)
(REC EQ)
V501 (IE)
V401 (REC LEV R)
V301 (REC LEV L)
BIAS R
IE
V403 (N.M)
REC. DOL. L
V402 (C)
V303 (N.M)
BIAS L
V302 (C)
L304 (L) (REC EQ)
(R944)
Q902
V901

Fig. 11-9 Points de réglage

1. Réglage de la balance CC de l'amplificateur CC

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	STOP	Pas d'entrée	V101 (canal gauche)	DC.BAL.TP-L	0 ± 0,2V DC	Faire une mesure au fil R114 en face du panneau avant
2			V201 (canal droit)	DC.BAL.TP-R	0 ± 0,2V DC	Faire une mesure au fil R124 en face du panneau avant

2. Réglage de base du circuit intégré de commande

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	STOP	Pas d'entrée	V901 (unité de commande)	Fiche 21 de Q902 (unité de commande)	200kHz ± 5kHz	Insérer un condensateur de quelques pF et faire une mesure à l'aide d'un fréquencemètre

3. Sensibilité du détecteur de cassette

- Faire une mesurer à l'aide d'un voltmètre CC à impédance d'entrée élevée (d'environ 1 mega-ohm).
- Brancher 5,1kohm en parallèle avec le R944 dans l'unité de commande pour le réglage, et l'enlever après la fin du réglage.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de régalge	Remarques
	STOP	Pas d'entrée (cassette non insérée)	V081 (voir Fig. 11-7) (unité de sortie B)	Entre 2 (+) et 1 (masse) (unité de sortie B)	2,5V ± 0,1V CC	Eviter qu'un éclairage intense ne vienne frapper l'interrupteur photo-électrique.

4. Réglage du transport de la bande et de l'azimutage de la tête

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	PLAY (reproduction)	Cassette équipée d'un miroir	Ecrou de réglage de hauteur (se référer à la Fig. 11-5)	Guide de la bande (se référer à la Fig. 11-5)	Pas d'ondulation de la bande au niveau du guide de la bande	Un mouvement et une ondulation égals à 1/5 de la largeur de la bande sont acceptables.
2	PLAY (reproduction)	Reproduire la partie 10kHz/–20dB de la bande d'essai STD-331B	Vis de réglage de l'azimutage de la tête (voir Fig. 11-6)	Bornes de sortie (OUTPUT) droit et gauche	Différence de phase nulle entre les canaux droit et gauche au niveau maximal de reproduction (fluctuation du niveau de reproduction, 1,0dB au maximum).	
3	Vérifier l'étape 1, et rerégler si nécessaire. Veiller à toujours effectuer l'étape 2 après l'étape 1.					

5. Réglage de l'égaliseur de reproduction

- Régler V103 et V203 (réglage du niveau de reproduction) au niveau maximal et les V102 et V202 sur la position mécanique médiane.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	PLAY (reproduction)	Reproduire les parties 315Hz –20dB et 10Hz/–20dB de la bande d'essai STD-331B	V102 (canal gauche) V202 (canal droit)	Bornes de sortie (OUTPUT) droit et gauche	Le niveau de reproduction à 10kHz doit être de +0,5dB supérieur au niveau de reproduction à 315Hz	Vérifier que la réponse en fréquence est située à l'intérieur de la zone de réponse en fréquence admissible (se référer à la Fig. 11-8)

6. Réglage du niveau de reproduction

- Ce réglage doit être effectué avec précision dans la mesure où il conditionne également le niveau de reproduction du réducteur de bruit DOLBY.

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
	PLAY (reproduction)	Reproduire la partie 315Hz/0dB de la d'essai STD-331B	V103 (canal gauche) V203 (canal droit)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	Laisser le commutateur du réducteur de bruit DOLBY désenclenché.

7. Réglage de l'indicateur de niveau

- Régler les V104, V105, V204 et V205 sur la position maximum et la commande du niveau de sortie également au maximum.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	STOP	Appliquer un signal de 315Hz/—10dBv (316mV) sur les bornes d'entrée	Commande de niveau d'entrée (INPUT)	REC.DOL-L REC.DOL-R	–7,7dBv (412,1mV)	
2		Régler le niveau du signal d'entrée sur –35dB (17,8mV)	Placer le commutateur MONITOR (contrôle d'enregistrement) su la position SOURCE			
3			V105 (canal gauche) V205 (canal droit)	Tourner lentement dans le sens des aiguilles d'une montre et s'arrêter lorsque les segments "–20dB" disparaissent.		
4		Régler le niveau du signal d'entrée sur –10dBv (316mV)	Placer le commutateur MONITOR (contrôle d'enregistrement) su la position SOURCE			
5			V104 (canal gauche) V204 (canal droit)	Tourner à fond dans le sens des aiguilles d'une montre, puis tourner dans le sens contraire des aiguilles d'une montre jusqu'à ce que les segments "0dB" apparaissent.		
6		Fermer le signal d'entrée lorsque les segments "0dB" apparaissent, et vérifier que le segment "–20dB" pour un canal disparaît et que "le différencie d'affichage résiduel" sur l'autre canal ne dépasse pas deux segments ("–20dBv" ou "–15dBv").				
7		Faire varier le niveau du signal d'entrée	Vérification	Affichage de l'indicateur +10dB	Activé pour un signal d'entrée de 0±3dBv	
8			Vérification	Affichage de l'indicateur –10dB	Activé pour un signal d'entrée de –20dBv±3dBv	

8. Réglage du courant d'effacement métal

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	REC (enregistrement)	Pas d'entrée, bande d'essai STD-604	V501	TP11-GND (masse)	175mV CA	

9. Réglage du circuit de polarisation

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	REC (enregistrement)	Pas d'entrée, bande d'essai STD-604	L 101 (canal gauche) L201 (canal droit)	PB.DOL-L PB.DOL-R	Dispersion minimale de polarisation	Faire les mesures à l'aide d'un voltmètre et d'un oscilloscope courant alternatif

10. Réglage de la polarisation d'enregistrement

- Placer le commutateur de contrôle d'enregistrement (MONITOR) sur la position SOURCE, et régler le niveau de sortie (OUTPUT) au maximum.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 6,3kHz/–20dB (100mV) sur les bornes d'entrée (INPUT)	Commande de niveau d'entrée (INPUT)	Bornes de sortie (OUTPUT) droite et gauche	–14dBv (199,5mV)	Enregistrement à –10VU
2	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-608A et faire une vérification d'écoute immédiate	V303 (canal gauche) V403 (canal droit)	Les bornes de sortie (OUTPUT) droite et gauche (et MONITOR) sur la position TAPE)	Après avoir tourné V303 et V403 à fond dans le sens des aiguilles d'une montre, tourner inversement dans le sens contraire des aiguilles d'une montre, et s'arrêter sur la position où le niveau s'abaisse de 3dB au dessous du niveau maximal de reproduction après être passé par ce niveau maximal de reproduction.	
3	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-603 et faire une vérification d'écoute immédiate	V302 (canal gauche) V402 (canal droit)		Après avoir tourné V302 et V402 à fond dans le sens des aiguilles d'une montre, tourner inversement dans le sens contraire des aiguilles d'une montre, et s'arrêter sur la position où le niveau s'abaisse de 2,5dB au dessous du niveau maximal de reproduction après être passé par ce niveau maximal de reproduction.	

11. Réglage du niveau d'enregistrement

- Laisser le réducteur de bruit DOLBY désenclenché.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 315Hz/–10dB (316mV) sur les bornes d'entrée (INPUT)	Commande de niveau d'entrée (INPUT)	REC.DOL-L REC.DOL-R	–7,7dBv (412,1mV)	
2	REC	Enregistrer le signal ci-dessus sur la band d'essai STD-608A et faire une vérification d'écoute immédiate	V301 (canal gauche) V401 (canal droit)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	
3	REC	Enregistrer le signal ci-dessus sur ls bandes d'essai STD-603A et STD-604 et faire une vérification d'écoute immédiate	Vérification	PBO.DOL-L PBO.DOL-R	–7,7±1,5dBv	

12. Réglage de la réponse en fréquence d'enregistrement et de reproduction

- Laisser le réducteur de bruit DOLBY désenclenché, et régler le niveau de sortie (OUTPUT) au maximum.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 315Hz/–30dB (31,6mV) aux bornes d'entrée (INPUT)	Commande de niveau MASTER REC	Bornes de sortie (OUTPUT) gauche et droite	–24dBv (63,1mV)	
2	REC	Enregistrer les signaux de 315Hz et 10kHz sur la bande d'essai STD-608A au niveau ci-dessus et faire un contrôle de reproduction simultané	V303 (canal gauche) V403 (canal droit)	Bornes de sortie (OUTPUT) droite et gauche	Régler le niveau de reproduction du 10kHz à 0dB plus élevé que le niveau du 315Hz	
3	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bande d'essai STD-608A, et vérifier que la zone admissible de réponse en fréquence indiquée sur la Fig. 11-10 est respectée (pour le DOLBY désenclenché, B et C).					
4	REC	De la même manière, enregistrer et reproduire le même signal sur la bande d'essai STD-604	L304 (canal gauche) L404 (canal droit)	Bornes de sortie (OUTPUT) droite et gauche	Régler le niveau de reproduction du 10kHz à 0±2dB plus élevé que leniveau du 315Hz	
5	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bonde d'essai STD-604, et vérifier que la zone admissible de réponse en fréquence indiquée sur la Fig. 11-12 est respectée (pour le DOLBY désenclenché, B et C).					
6	REC	De la même manière, enregistrer et reproduire le même signal sur la bande d'essai STD-603	L302 (canal gauche) L402 (canal droit)	Bornes de sortie (OUTPUT) droit et gauche	Régler le niveau de reproduction du 10kHz à 0dB en fonction du niveau du 315Hz (le commutateur MONITOR étant sur la position TAPE)	
7	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bande d'essai STD-603, et vérifier que la zone admissible de réponse en fréquence indiquée sur la Fig. 11-11 est respectée (pour le DOLBY désenclenché, B et C).					

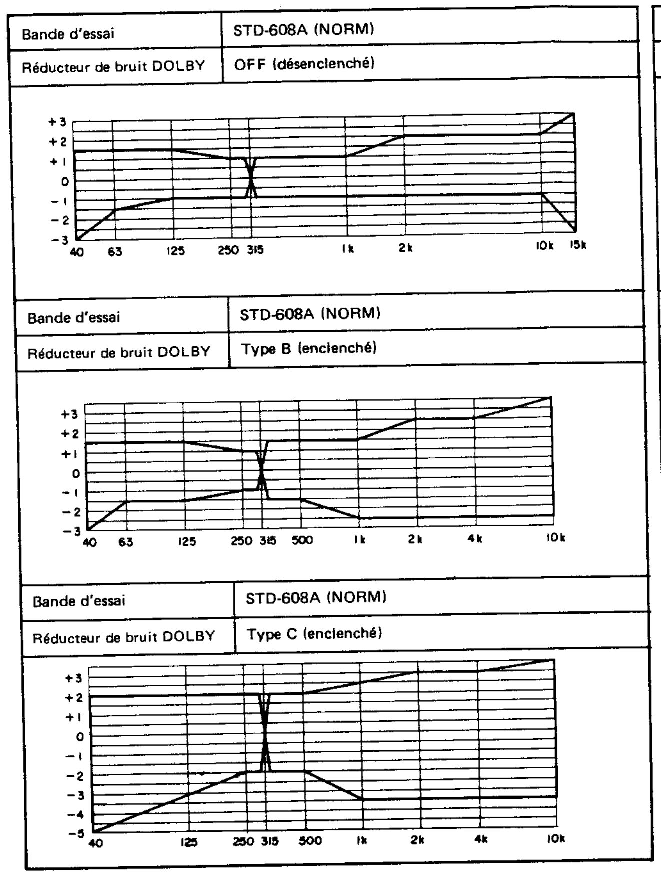


Fig. 11-10 Zone admissible de réponse en fréquence d'enregistrement/reproduction (NORM)

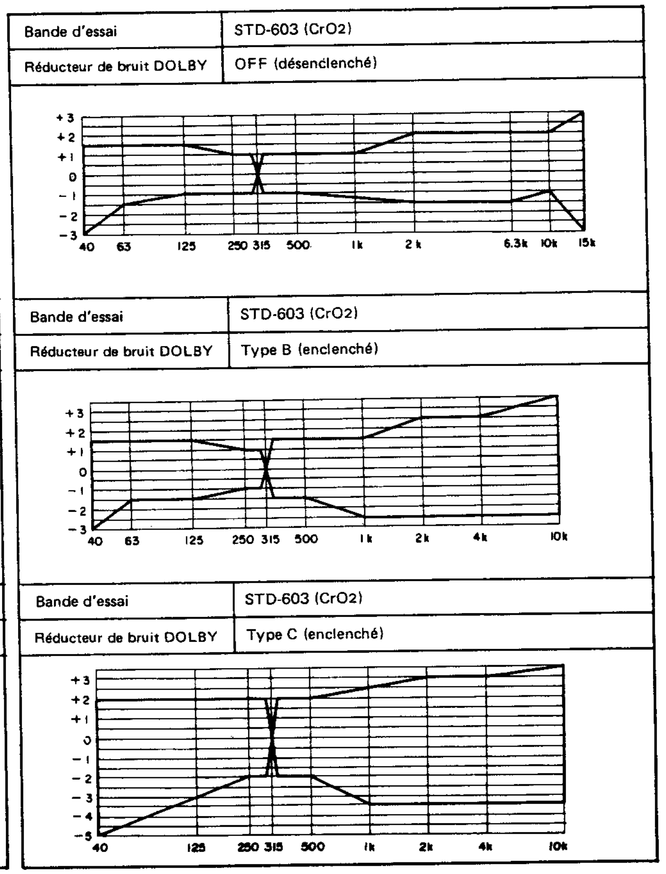


Fig. 11-11 Zone admissible de réponse en fréquence d'enregistrement/reproduction (CrO_2)

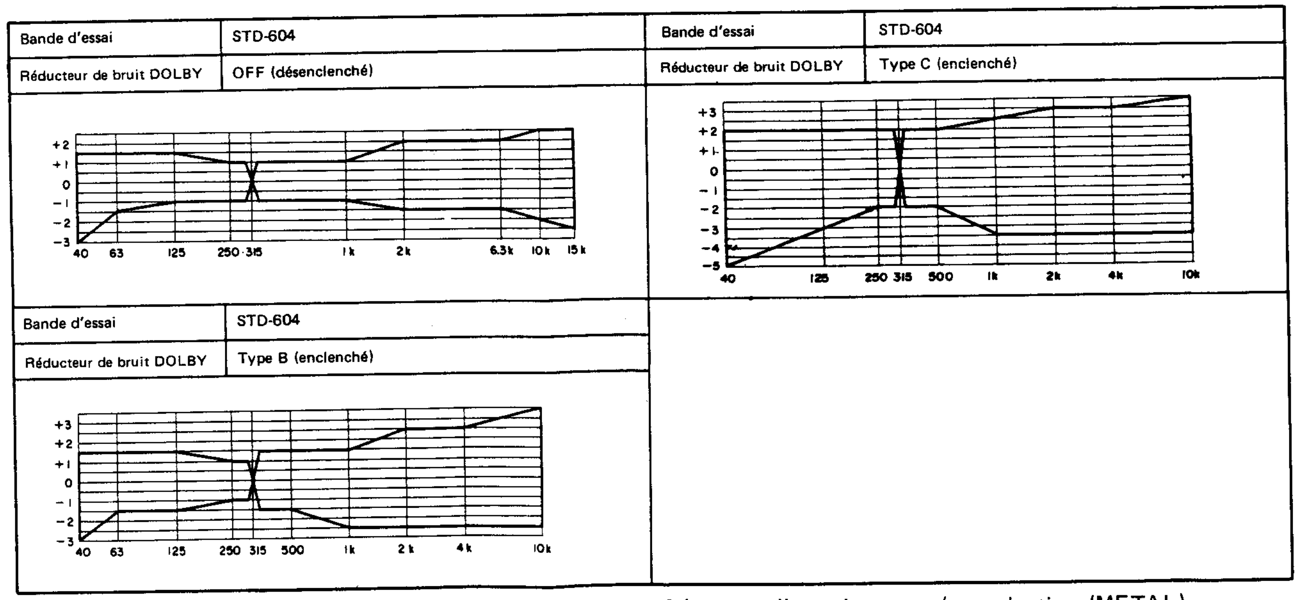


Fig. 11-12 Zone admissible de réponse en fréquence d'enregistrement/reproduction (METAL)

11. AJUSTE

11.1 AJUSTES MECANICOS

11.1.1 Ajuste de la velocidad de la cinta

* Emplear un frecuencímetro

Modo	Lugar de ajuste	Especificaciones
PLAY (Reproducción)	Resistor variable del orificio de ajuste del motor del eje de arrastre	La frecuencia de reproducción debe estar dentro del margen de 3005 ± 10Hz al principio de la cinta de prueba STD-301.
PLAY (Reproducción)	Comprobar	La frecuencia de reproducción debe estar dentro del margen de 3000 ± 30Hz al principio de la cinta de prueba STD-301.

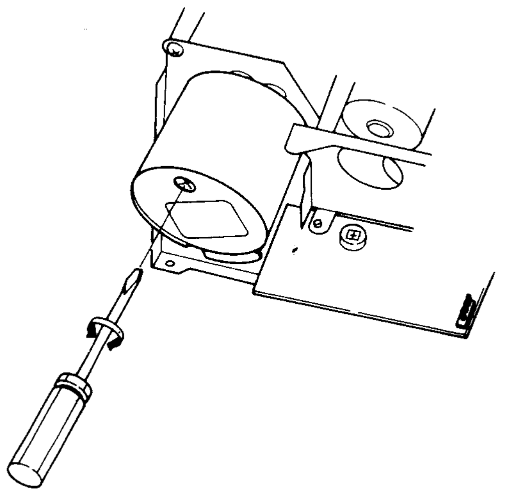
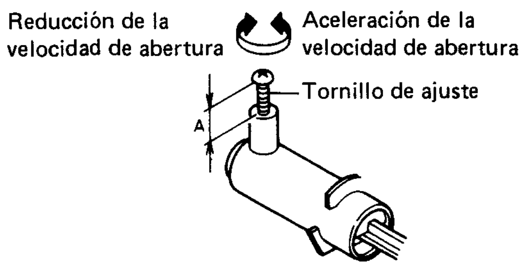


Fig. 11-1 Ajuste de la velocidad de la cinta

11.1.2 Ajuste del amortiguador neumático

Lugar de ajuste	Especificaciones
Tornillo de ajuste del cilindro	La puerta deberá abrirse suavemente (sin chirridos, etc.), y no deberá "rebotar" cuando queda completamente abierta.


Reducción de la velocidad de abertura
Aceleración de la velocidad de abertura
Tornillo de ajuste
A

Valor de referencia: A = 2±0,5mm

Fig. 11-12 Ajuste del amortiguador neumático

11.1.3 Ajuste de la posición de la puerta

Comprobación 1	Mirando desde delante, las relaciones entre las dimensiones A y B, y entre las dimensiones C y D deben estar dentro del margen de 0,5 a 2.
Comprobación 2	Mirando desde delante, la diferencia entre E y G no debe exceder de ±0,4mm, y E, F y G deben exceden todos de 0,5mm.
Si no se satisfacen las especificaciones de arriba, aflojar los tornillos y reajustar la posición de la puerta.	

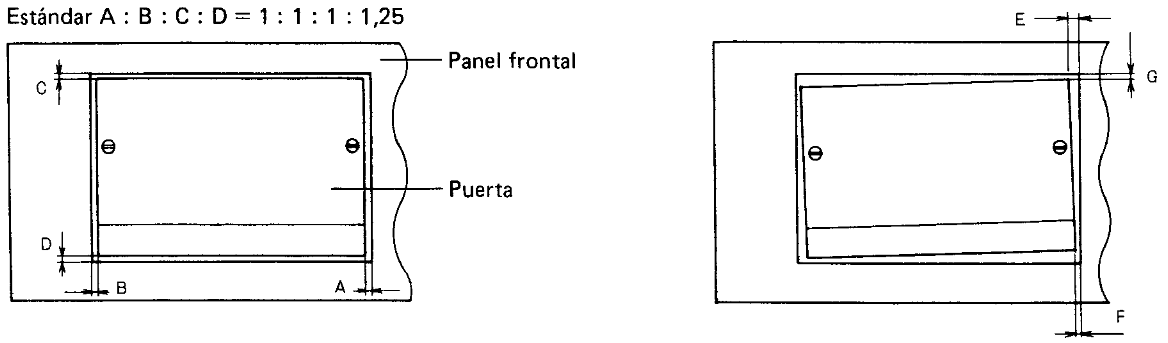

Estándar A : B : C : D = 1 : 1 : 1 : 1,25
Panel frontal
Puerta
C
D
B
A
E
G
F

Fig. 11-3 Ajuste de la posición de la puerta

11.2 AJUSTES ELECTRICOS

Condiciones para el ajuste

1. Los ajustes mecánicos deben haberse completado en primer lugar.
2. Las cabezas deben limpiarse y desmagnetizarse.
3. Dejar precalentarse el magnetófono durante algunos minutos antes de iniciar los ajustes eléctricos.
4. El nivel de la señal de referencia es de 0dBv 1Vrms.
5. Conectar una resistencia de carga de 50K ohmios (o entre 47 a 52K ohmios) a los terminales OUTPUT.
6. A menos que se especifique lo contrario, dejar el control del nivel de OUTPUT en la posición de nivel máximo.
7. Del mismo modo, los demás mandos enumerados a continuación deberán dejarse en las posiciones indicadas a menos que se especifique lo contrario.
   TIMER : OFF
   DOLBY NR : OFF
   MPX FILTER : OFF

Cintas de prueba

STD-331B*	: Ajustes de reproducción (ver la Fig. 11-4)
STD-608A	: Cinta en blanco NORMAL
STD-603	: Cinta en blanco de CrO_2
STD-604	: Cinta en blanco de METAL

* Mientras que el nivel de grabación de referencia para la STD-331A es de 333Hz, 250nwb/m, el mismo nivel para STD-331B es de 315Hz, 160nwb/m.

Lista de ajustes

1. Ajuste del balance de CC del amplificador de CC
2. Ajuste del reloj del IC de control
3. Ajuste de la sensibilidad del detector de casete
4. Ajuste del transporte de la cinta y del acimut de la cabeza
5. Ajuste del ecualizador de reproducción
6. Ajuste del nivel de reproducción
7. Ajuste del medidor de nivel
8. Ajuste de la corriente de borrado de METAL
9. Ajuste de la trampa de polarización
10. Ajuste de la polarización de grabación
11. Ajuste del nivel de grabación
12. Ajuste de la respuesta en frecuencia de grabación y reproducción

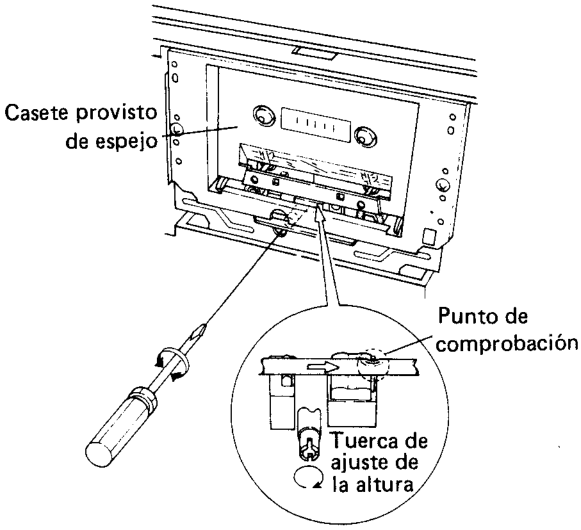

Casete provisto de espejo
Punto de comprobación
Tuerca de ajuste de la altura

Fig. 11-5 Ajuste del transporte de la cinta

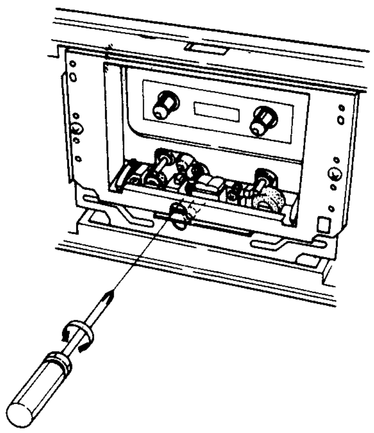


Fig. 11-6 Ajuste del acimut de la cabeza

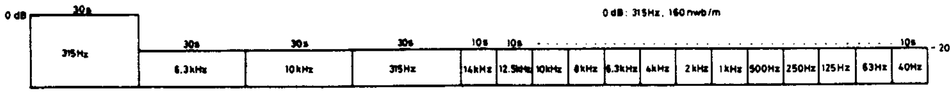

0 dB
30s
315Hz
30s
6.3kHz
30s
10kHz
30s
315Hz
10s
14kHz
10s
12.5kHz
10kHz
8kHz
6.3kHz
4kHz
2kHz
1kHz
500Hz
250Hz
125Hz
63Hz
10s
40Hz
- 20dB
0 dB : 315Hz, 160nwb/m

Fig. 11-4 Cinta de prueba STD-331B

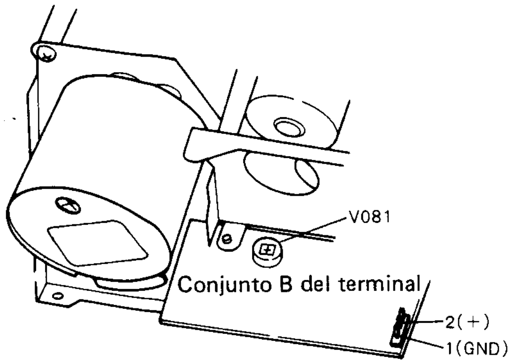

V081
Conjunto B del terminal
2(+)
1(GND)

Fig. 11-7 Ajuste de la sensibilidad del detector de casete

Cinta de prueba	STD-331B
Interruptor DOLBY	OFF

* El canal derecho se compensa en −1dB desde las mediciones actuales a 40Hz y 63Hz.

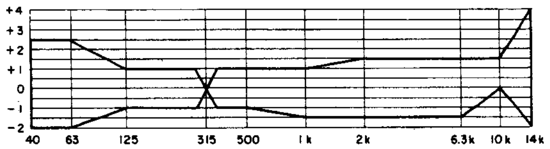


Fig. 11-8 Zona permisible de la respuesta en frecuencia de reproducción

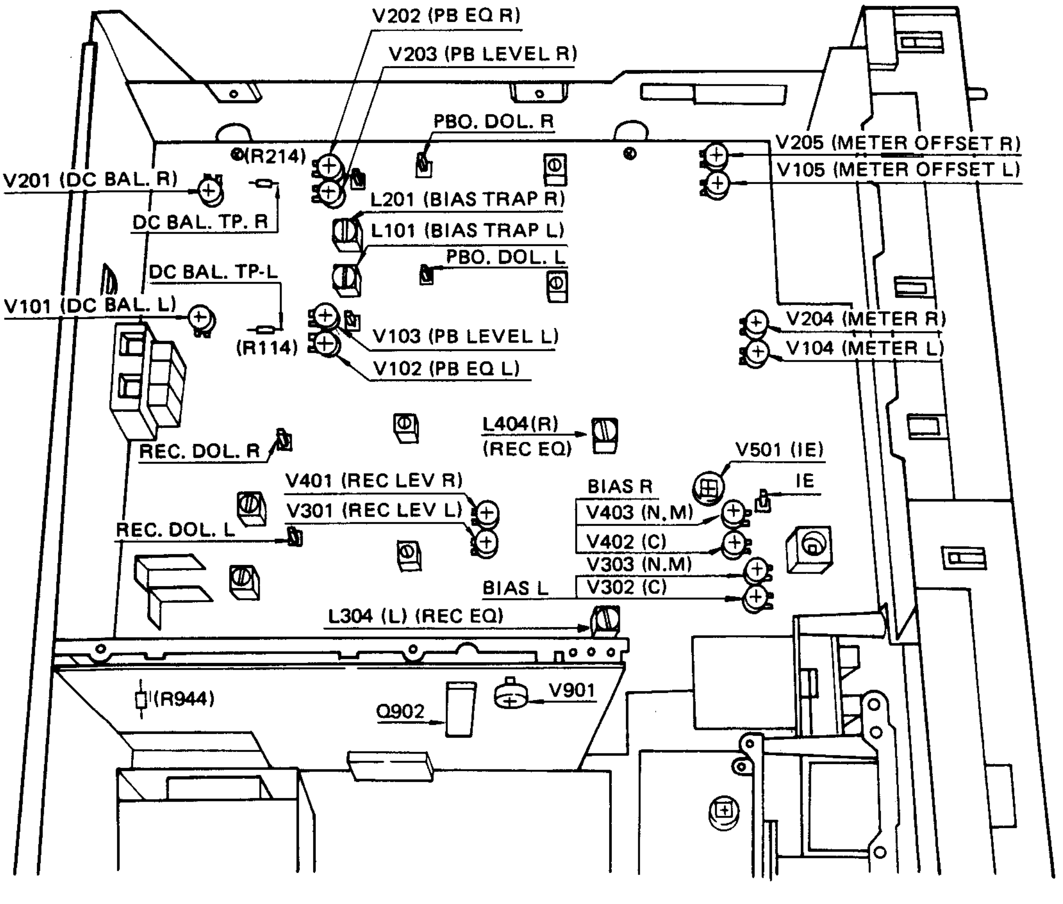

V202 (PB EQ R)
V203 (PB LEVEL R)
PBO. DOL. R
(R214)
V201 (DC BAL. R)
DC BAL. TP. R
L201 (BIAS TRAP R)
L101 (BIAS TRAP L)
PBO. DOL. L
DC BAL. TP-L
V101 (DC BAL. L)
(R114)
V103 (PB LEVEL L)
V102 (PB EQ L)
V205 (METER OFFSET R)
V105 (METER OFFSET L)
V204 (METER R)
V104 (METER L)
REC. DOL. R
L404(R)
(REC EQ)
V501 (IE)
BIAS R
IE
V401 (REC LEV R)
V301 (REC LEV L)
V403 (N.M)
V402 (C)
REC. DOL. L
V303 (N.M)
BIAS L
V302 (C)
L304 (L) (REC EQ)
(R944)
Q902
V901

Fig. 11-9 Lugares de ajuste

1. Ajuste del balance de CC del amplificador de CC

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP (Parada)	Sin entrada	V101 (canal izquiedo)	DC.BAL.TP-L	0±0,2V CC	Medir en el conductor de R114 encarado hacia el panel frontal)
2			V201 (canal derecho)	DC.BAL.TP-R	0±0,2V CC	Medir en el conductor de R214 encarado hacia el panel frontal)

2. Ajuste del reloj del IC de control

	Mode	Señal dé entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	STOP (Parada)	Sin entrada	V901 (Conjunto de control)	Pin 21 of Q902 (Conjunto de control)	200kH±5kHz	Insertar un condensador de pocos pF y medir con el frecuencímetro.

3. Sensibilidad del detector de casete

•

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	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	STOP (Parada)	Sin entrada (sin casete insertado)	V081 (ver la Fig. 11-7) (Conjunbo B de terminales)	Entre 2(+) y 1 (conjunto B de terminales)	2,5±V0,1V CC	Evitar iluminación intensa en el fotointerruptor

4. Ajuste del transporte de la cinta y del acimut de la cabeza

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP (Reproducción)	Casete provisto de espejo	Tuerca de ajuste de la altura (ver la Fig. 11-5)	Guía de cinta (ver la Fig. 11-5)	Sin bucle de cinta en la guía de cinta	Bucle de cinta y flotación hasta de 1/5 de la anchura de la cinta permisible
2	PLAY (Reproducción)	Reproducir la sección de 10kHz/–20dB de la cinta de prueba STD-331B)	Tornillo de ajuste del acimut de la cabeza (ver la Fig. 11-6)	Terminales OUTPUT izquierdo y derecho	Diferencia de fase cero entre los canales izquierdo y derecho al nivel de señal de reproducción máximo (fluctuación del nivel de reproducción de 1,0dB máx.)	
3	Verificar el paso 1, y reajustar si resulta necesario. Efectuar siempre el paso 2 después de haber realizado el paso 1.					

5. Ajuste del ecualizador de reproducción

- Ajustar V103 y V203 (AJUS. del nivel de reproducción) al nivel máximo, y V102 y V202 (AJUS. ECUAL. de reproducción) a las posiciones de centro mecánico.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	PLAY (Reproducción)	Reproducir las secciones de 315Hz/–20dB y de de 10kHz/–20dB de la cinta de prueba STD-331B	V102 (canal izquierdo) V202 (canal derecho)	Terminales (OUTPUT) izquierdo y derecho	Nivel de reproducción a 10kHz a ser +0,5dB mayor que el nivel de reproducción d 315Hz	Comprobar que la respuesta en frecuencia caiga dentro del margen permisible de respuesta en frecuencia de reproducción (ver la Fig. 11-8)

6. Ajuste del nivel de reproducción

•

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observacions
	PLAY (Reproduction)	Reproducir la sección de 315Hz/0dB de la cinta de prueba STD-331B	V103 (canal izquierdo) V203 (canal derecho)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	Dejar el interruptor DOLBY NR en la posición OFF

7. Ajuste del medidor de nivel

- Ajustar V104, V105, V204 y V205 a las posiciones máximas, y el control del nivel de OUTPUT al nivel máximo.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP (Parada)	Aplicar una señal de 315Hz/–10dBv (316mV) a los terminales INPUT	Control del nivel INPUT	REC.DOL.-L REC.DOL-R	–7,7dBv (412,1mV)	
2		Ajustar el nivel de la señal de entrada a –35dBv (17,8mV)	Poner el interruptor MONITOR en la posición SOURCE			
3			V105 (canal izquierdo) V205 (canal derecho)	Girar lentamente hacia la izquierda y parar cuando se apaguen los segmentos de "–20dB".		
4		Ajustar el nivel de la señal de entrada a –10dBv (316mV)	Poner el interruptor MONITOR en la posición SOURCE.			
			V104 (canal izquierdo) V204 (canal derecho)	Después de girar completamente hacia la izquierda, volver a girar hacia la derecha hasta que se enciendan los segmentos de "0dB".		
6		Desactivar la señal de entrada cuando se enciendan los segmentos de "0dB", y comprobar que cuando se apagan los segmentos de "–20dB" para un canal, la 'discrepancia en la indicación residual' del otro canal no es de más de dos segmentos ("–20dB" o "–15dB").				
7		Variar el nivel de la señal de entrada	Comprobar	Indicación del medidor de +10dB	Se ilumina en nivel de entrada de 0±3dBv	
8			Comprobar	Indicación del medidor de –10dB	Se ilumina en el nivel de entrada de –20±3dBv	

8. Ajuste de la corriente de borrado de METAL

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	REC (Grab.)	Sin entrada, cinta de prueba STD-604	V501	IE-GND	175mV AC	

9. Ajuste de la trampa de polarización

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	REC (Grab.)	Sin entrada, cinta de prueba STD-604	L101 (canal izquierdo) L201 (canal derecho)	PB.DOL-L PB.DOL-R	Fuga de polarización mínima	Medir con un voltímetro de CA y un osciloscopio

10. Ajuste de la polarización de grabación

- Poner el interruptor MONITOR en la posición SOURCE y ajustar el control de nivel OUTPUT al nivel máximo.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar medición	Valor de ajuste	Observaciones
1	REC-PAUSE (Grab.-Pausa	Aplicar una señal de 6,3kHz/–20dBv (100mV) a los terminales INPUT	Control del nivel INPUT	Terminales izquierdo y derecho OUTPUT	–14dBv (199,5mV)	Grabación a –10VU
2	REC (Grab.)	Grabar la señal de arriba en la cinta de prueba STD-608A y monitorizar simultáneamente la reproducción	V303 (canal izquierdo) V403 (canal derecho)	Terminales OUTPUT izquierdo y derecho (e interruptor MONITOR en la posición TAPE)	Después de haber girado en primer lugar V303 y V403 completamente hacia la izquierda, girar de nuvo hacia la derecha y parar en la posición en la que el nivel caiga 3dB por debajo del nivel de reproducción máximo después de pasar por esta posición de nivel máximo.	
3	REC (Grab.)	Grabar la señal de arriba en la cinta de prueba STD-603 y monitorizar simultáneamente la reproducción.	V302 (canal izquierdo) V402 (canal derecho)		Después de haber girado en primer lugar V302 y V402 completamente hacia la izquierda, girar de nuevo hacia la derecha y parar en la posición en la que el nivel caiga 2,5dB por debajo del nivel de reproducción máximo después de pasar por esta posición de nivel máximo.	

11. Ajuste del nivel de grabación

- Dejar el interruptor DOLBY NR en la posición OFF.

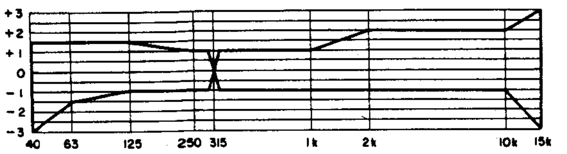
	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	REC-PAUSE (Grab-pausa)	Aplicar una señal de 315Hz/−10dBv (316mV) a los terminales INPUT	Control del nivel INPUT	REC.DOL-L REC.DOL-R	−7,7dBv (412,1mV)	
2	REC (Grab.)	Grabar la señal de arriba en la cinta de prueba STD-608A y monitorizar simultáneamente la reproducción	V301 (canal izquierdo) V401 (canal derecho)	PBO.DOL-L PBO.DOL-R	−7,7dBv (412,1mV)	
3	REC (Grab.)	Grabar la señal de arriba en las cintas de prueba STD-603 y STD-604 y monitorizar simultáneamente la reproducción	Comprobar	PBO.DOL-L PBO.DOL-R	−7,7±1,5dBv	

12. Ajuste de la respuesta en frecuencia de grabación y reproducción

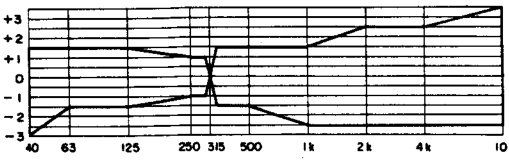
- Dejar el interruptor DOLBY NR en la posición OFF, y ajustar el control del nivel OUTPUT al nivel máximo.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	REC-PAUSE (Grab-pausa)	Aplicar una señal de 315Hz/−30dBv (31,6mV) a los terminales INPUT	Control del nivel INPUT	Terminales INPUT izquierdo y derecho	−24dBv (63,1mV)	
2	REC (Grab.)	Grabar la señal de arriba en la cinta de prueba STD-608A a 315Hz y 10kHz, y monitorizar simultáneamente la reproducción	V303 (canal izquierdo) V403 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajustar el nivel de reproducción de 10kHz a 0dB más alto que el nivel de 315Hz (con el interruptor MONITOR en la posición TAPE)	
3	Grabar y reproducir señales hasta 15kHz en la cinta de prueba STD-608A y volver a comprobar que se satisfaga la zona permisible de respuesta en frecuencia mostrada en la Fig. 11-10 (para DOLBY NR OFF, y B y C).					
4	REC (Grab.)	Del mismo modeo, grabar y reproducir la misma señal en la cinta de prueba STD-604	L304 (canal izquierdo) L404 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajustar el nivel de reproducción de 10kHz a 0±2dB con respecto al nivel de 315Hz (con el interruptor MONITOR en la posición TAPE)	
5	Grabar y reproducir señales hasta de 15kHz en la cinta de prueba STD-604, y comprobar que la zona permisible de respuesta en frecuencia mostrada en la Fig. 11-12 se satisfaga (para DOLBY NR OFF, y B y C).					
6	REC (Grab.)	Del mismo modeo, grabar y reproducir la misma señal en la cinta de prueba STD-603	V302 (canal izquierdo) V402 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajustar el nivel de reproducción de 10kHz a 0dB con respecto al nivel de 315kHz (con el interruptor MONITOR en la posición TAPE).	
7	Grabar y reproducir señales hasta de 15kHz en la cinta de prueba STD-603, comprobar que se satisfaga la zona permisible de respuesta en frecuencia mostrada en la Fig. 11-11 (para DOLBY NR OFF, y B y C).					

Cinta de prueba	STD-608A (NORM)
Interruptor DOLBY NR	OFF



Cinta de prueba	STD-608A (NORM)
Interruptor DOLBY NR	Tipo B activado



Cinta de prueba	STD-608A (NORM)
Interruptor DOLBY NR	Tipo C activado

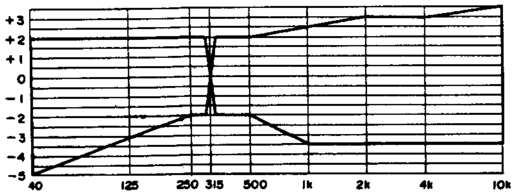
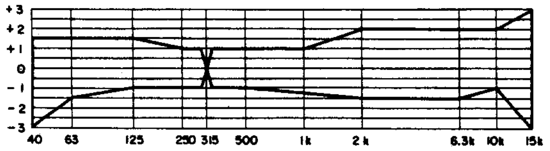
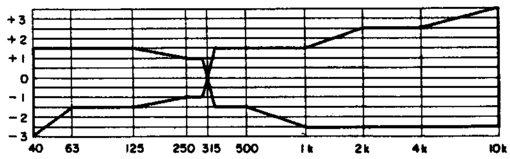


Fig. 11-10 Zona permisible de respuesta en frecuencia de grabación y reproducción (NORM)

Cinta de prueba	STD-603 (CrO2)
Interruptor DOLBY NR	OFF



Cinta de prueba	STD-603 (CrO2)
Interruptor DOLBY NR	Tipo B activado



Cinta de prueba	STD-603 (CrO2)
Interruptor DOLBY NR	Tipo C activado

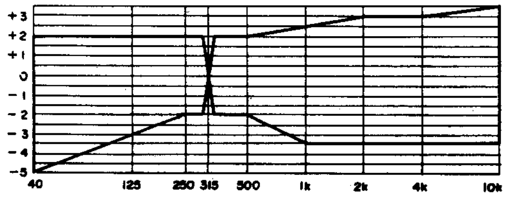
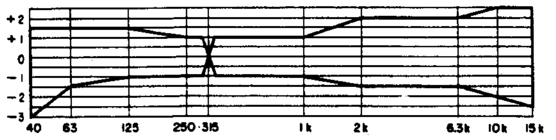
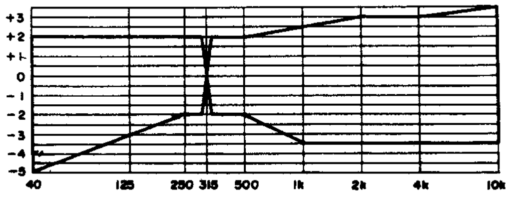


Fig. 11-11 Zona permisible de respuesta en frecuencia de grabación y reproducción (CrO2)

Cinta de prueba	STD-604
Interruptor DOLBY NR	OFF



Cinta de prueba	STD-604
Interruptor DOLBY NR	Tipo C activado



Cinta de prueba	STD-604
Interruptor DOLBY NR	Tipo B activado

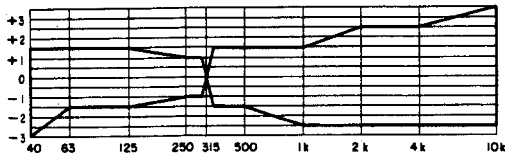


Fig. 11-12 Zona permisible de respuesta en frecuencia de grabación y reproducción (METAL)

12. SUPPLEMENT FOR KC, D, HEM, HB AND HP TYPES

Models CT-A7/KC (Canada model), HEM (European continent model), HB (United Kongdom model), HP (Australia model), and D (General export model) are the same as the CT-A7/KU (U.S.A. model) with the exception of this supplement.

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

  560Ω 56 x 10^1 561 .... RD¼PS $\boxed{5}\boxed{6}\boxed{1}$J
  47kΩ 47 x 10^3 473 .... RD¼PS $\boxed{4}\boxed{7}\boxed{3}$J
  0.5Ω 0R5 .... RN2H $\boxed{0}\boxed{R}\boxed{5}$K
  1Ω 010 .... RS1P $\boxed{0}\boxed{1}\boxed{0}$K

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

  5.62kΩ 562 x 10^1 5621.......... RN¼SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$F
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*

  ★★ GENERALLY MOVES FASTER THAN ★.

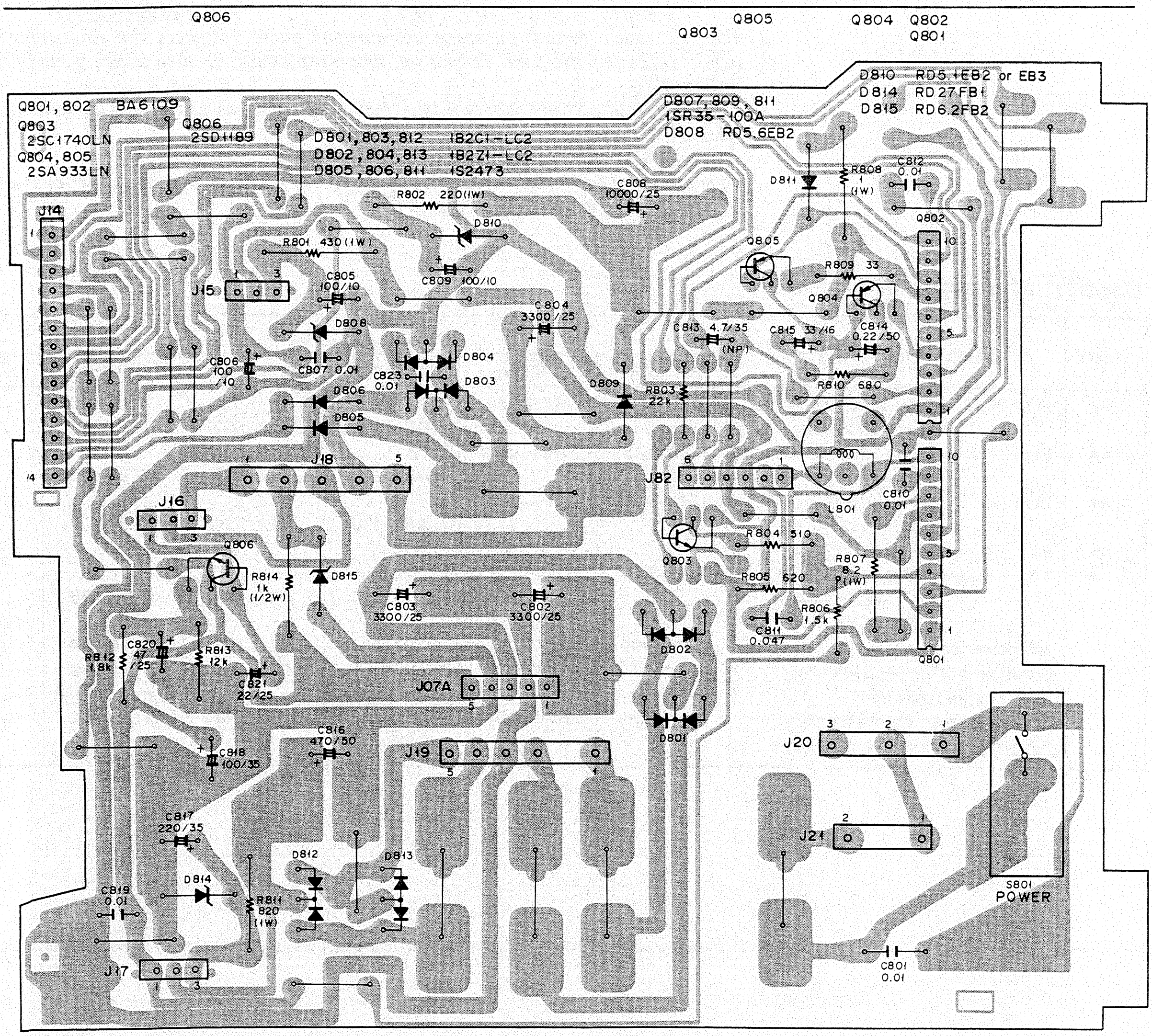
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Contrast of Miscellaneous Parts

Mark	Symbol & Description	Part No.					
		KU type	KC type	HEM type	HB type	HP type	D type
⚠★★	FU1, FU2 Fuse (630mA)	REK-078	REK-078	....	....	....	....
	Fuse (T315mA)	....	....	REK-052	REK-052	REK-052	....
⚠★★	FU3 Fuse (1.6A)	REK-074	REK-074	....	....	....	....
	Fuse (T500mA)	....	....	REK-049	REK-049	REK-049	....
⚠★★	FU4 Fuse (500mA)	REK-077	REK-077	....	....	....	....
	Fuse (T1.25A)	....	....	REK-070	REK-070	REK-070	....
⚠★★	S1 Line voltage selector	....	....	....	....	....	RSX-057
⚠ ★	T1 Power transformer (120V)	RTT-351	RTT-353	....	....	....	....
	(220V/240V)	....	....	RTT-355	RTT-355	RTT-355	....
	(120V/220V/240V)	....	....	....	....	....	RTT-357
⚠	AC power cord	RDG-048	RDG-048	RDG-027	RDG-032	RDG-029	RDG-050
⚠	Strain relief (for AC power cord)	REC-395	REC-395	REC-396	REC-396	REC-396	REC-395
	Power supply assembly	Non supply	Same as KU	Non supply	Same as HEM	Same as HEM	Non supply
	Operating instructions (English)	RRB-224	RRB-224	....	RRB-224	RRB-224	RRB-224
	(English/German/French/Italian)	....	....	RRE-054	....	....	....

Power Supply Assembly for D Type

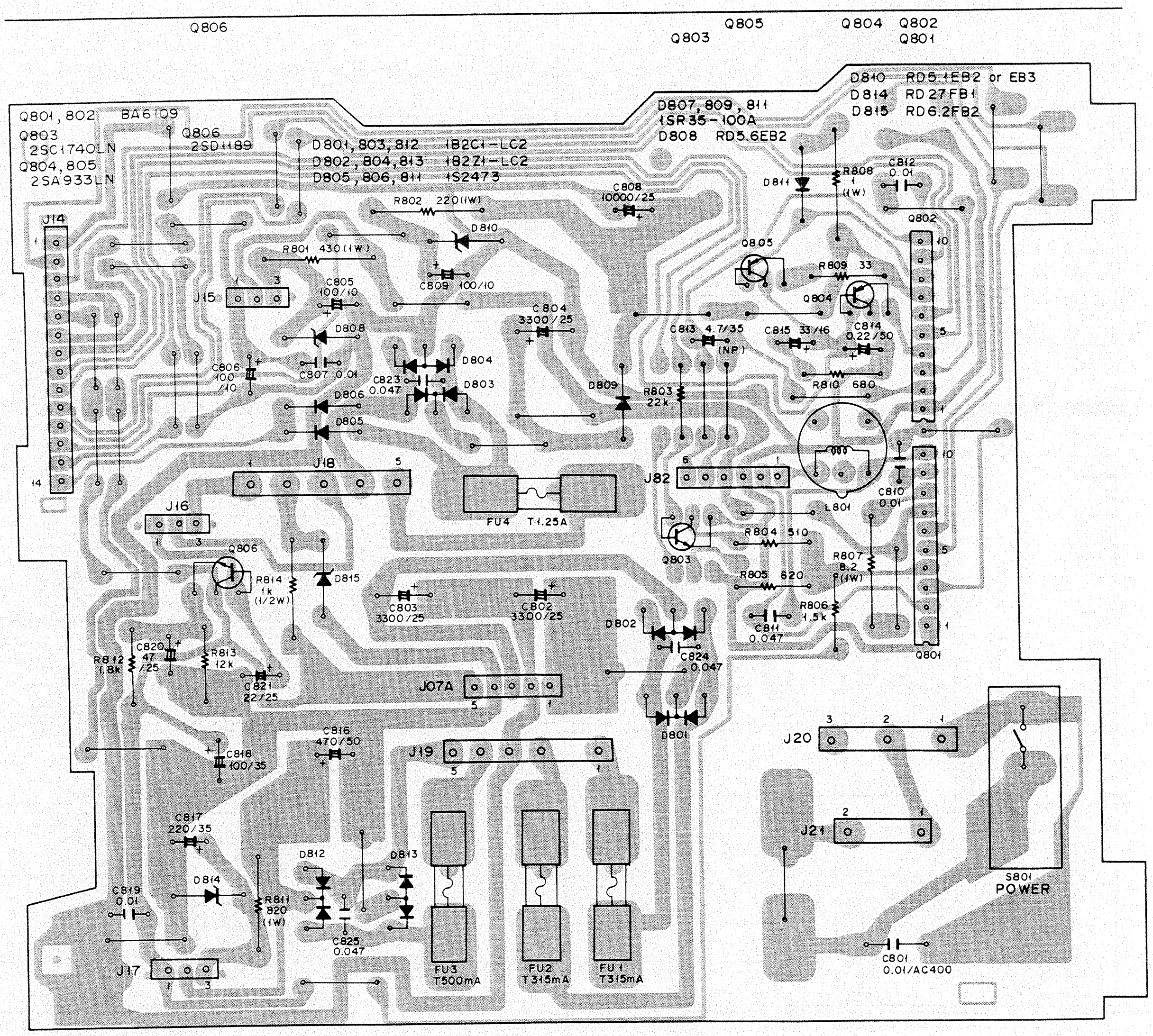
Power supply assembly for D type is the same as the KU type with the exception of the fuse holders for FU1 – FU4.


Q806
Q803
Q805
Q804
Q802
Q801
Q801, 802 BA6109
Q803 2SC1740LN
Q804, 805 2SA933LN
Q806 2SD1189
D801, 803, 812 1B2C1-LC2
D802, 804, 813 1B2Z1-LC2
D805, 806, 811 1S2473
D807, 809, 811 1SR35-100A
D808 RD5.6EB2
D810 RD5.1EB2 or EB3
D814 RD27FB1
D815 RD6.2FB2
J14
J15
J16
J17
J18
J19
J20
J21
J82
J07A
R801 430(1W)
R802 220(1W)
R803 22k
R804 510
R805 620
R806 1.5k
R807 8.2 (1W)
R808 1 (1W)
R809 33
R810 680
R811 820 (1W)
R812 1.8k
R813 12k
R814 1k (1/2W)
C801 0.01
C802 3300/25
C803 3300/25
C804 3300/25
C805 100/10
C806 100/10
C807 0.01
C808 10000/25
C809 100/10
C810 0.01
C811 0.047
C812 0.01
C813 4.7/35 (NP)
C814 0.22/50
C815 33/16
C816 470/50
C817 220/35
C818 100/35
C819 0.01
C820 47/25
C821 22/25
C823 0.01
D801
D802
D803
D804
D805
D806
D808
D810
D811
D812
D813
D814
D815
L801
S801 POWER

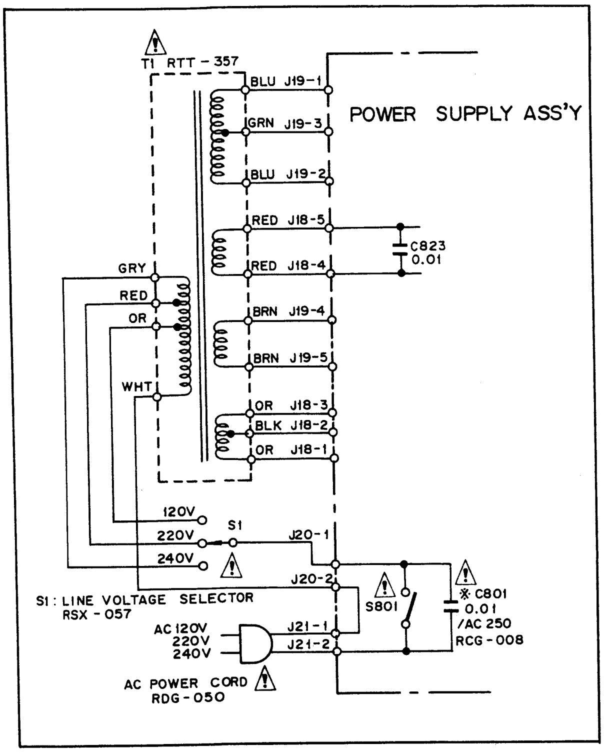
Power Supply Assembly for HEM, HB and HP Types

Power supply assembly for HEM, HB and HP types is the same as the KU type with the exception of the following parts and the fuses on the P.C. board.

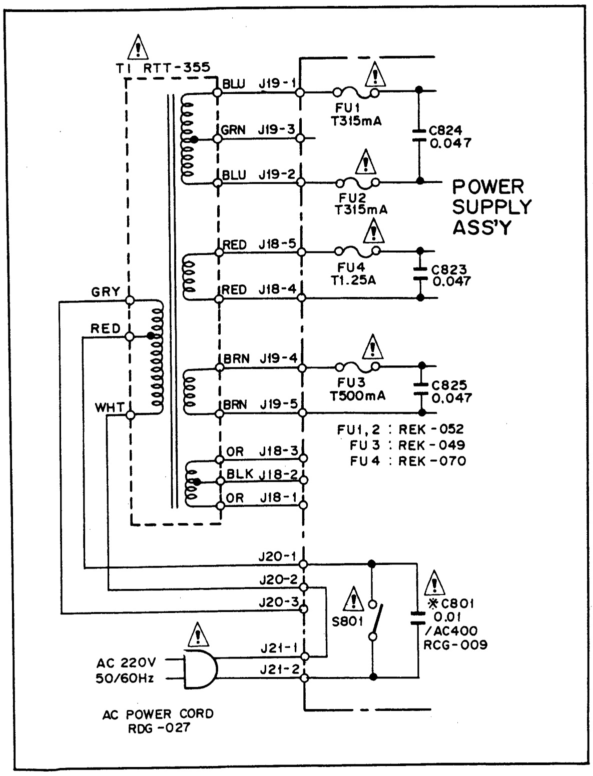
Mark	Cymbol & Description		Part No.		Remarks
			for KU type	for HEM type	
⚠	C801	Ceramic capacitor	RCG-008	....	0.01/AC250V
			....	RCG-009	0.01/AC400V
	C823		CKDYF 103Z 50	CKDYF 473Z 50	
	C824, C825		....	CKDYF 473Z 50	


Q806
Q805
Q803
Q804 Q802
Q801
Q801, 802 BA6109
Q803 2SC1740LN
Q804, 805 2SA933LN
Q806 2SD1189
D801, 803, 812 1B2C1-LC2
D802, 804, 813 1B2Z1-LC2
D805, 806, 811 1S2473
D807, 809, 811 1SR35-100A
D808 RD5.6EB2
D810 RD5.1EB2 or EB3
D814 RD27FB1
D815 RD6.2FB2
J14
J15
J16
J17
J18
J19
J20
J21
J07A
J82
R802 220(1W)
R801 430(1W)
D810
C805 100/10
C809 100/10
C808 10000/25
C804 3300/25
D808
C806 100/10
C807 0.01
C823 0.047
D806
D805
D804
D803
D809
R803 22k
C813 4.7/35 (NP)
C815 33/16
C814 0.22/50
R810 680
R808 1 (1W)
C812 0.01
D811
R809 33
L801
C810 0.01
R804 510
R805 620
R807 8.2 (1W)
R806 1.5k
C811 0.047
D802
C824 0.047
D801
FU4 T1.25A
R814 1k (1/2W)
D815
C803 3300/25
C802 3300/25
C820 47/25
R812 1.8k
R813 12k
C821 22/25
C816 470/50
C818 100/35
C817 220/35
D812
D813
D814
R811 820 (1W)
C819 0.01
C825 0.047
FU3 T500mA
FU2 T315mA
FU1 T315mA
S801 POWER
C801 0.01/AC400

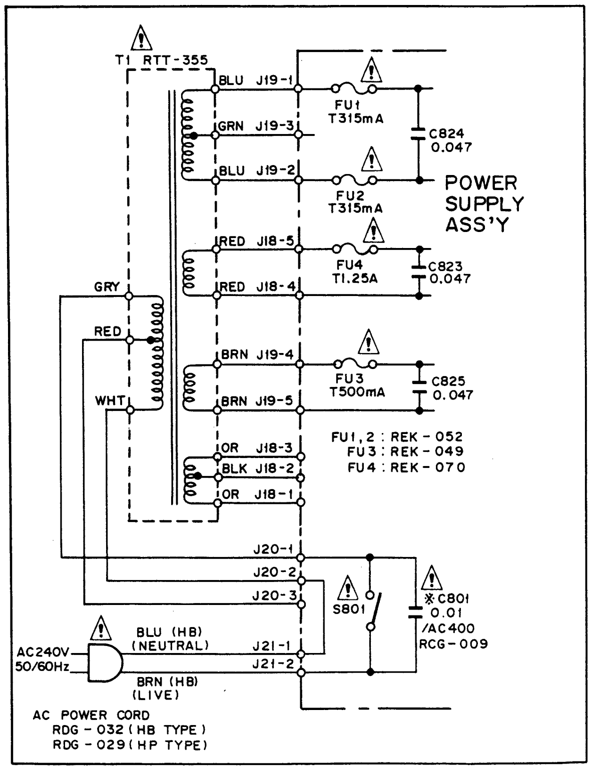
Power Supply Circuit for D Type


T1 RTT-357
BLU J19-1
GRN J19-3
BLU J19-2
RED J18-5
RED J18-4
BRN J19-4
BRN J19-5
OR J18-3
BLK J18-2
OR J18-1
POWER SUPPLY ASS'Y
C823
0.01
GRY
RED
OR
WHT
120V
220V
240V
S1
J20-1
J20-2
S801
※C801
0.01
/AC 250
RCG-008
S1 : LINE VOLTAGE SELECTOR
RSX-057
AC 120V
220V
240V
J21-1
J21-2
AC POWER CORD
RDG-050

Power Supply Circuit for HEM Type


T1 RTT-355
BLU J19-1
GRN J19-3
BLU J19-2
RED J18-5
RED J18-4
BRN J19-4
BRN J19-5
OR J18-3
BLK J18-2
OR J18-1
FU1
T315mA
C824
0.047
FU2
T315mA
POWER
SUPPLY
ASS'Y
FU4
T1.25A
C823
0.047
FU3
T500mA
C825
0.047
FU1,2 : REK-052
FU3 : REK-049
FU4 : REK-070
GRY
RED
WHT
J20-1
J20-2
J20-3
S801
※C801
0.01
/AC400
RCG-009
AC 220V
50/60Hz
J21-1
J21-2
AC POWER CORD
RDG-027

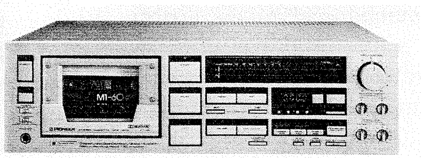
Power Supply Circuit for HB and HP Types


T1 RTT-355
BLU J19-1
GRN J19-3
BLU J19-2
RED J18-5
RED J18-4
BRN J19-4
BRN J19-5
OR J18-3
BLK J18-2
OR J18-1
FU1
T315mA
C824
0.047
FU2
T315mA
POWER
SUPPLY
ASS'Y
FU4
T1.25A
C823
0.047
FU3
T500mA
C825
0.047
FU1,2 : REK-052
FU3 : REK-049
FU4 : REK-070
GRY
RED
WHT
J20-1
J20-2
J20-3
S801
※C801
0.01
/AC400
RCG-009
BLU (HB)
(NEUTRAL)
AC240V
50/60Hz
J21-1
J21-2
BRN (HB)
(LIVE)
AC POWER CORD
RDG-032 (HB TYPE)
RDG-029 (HP TYPE)

PIONEER®

Service Manual

CIRCUIT & MECHANISM DESCRIPTIONS



ORDER NO.
ARP-462-0

STEREO CASSETTE TAPE DECK

CT-A9

CT-A7

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS [USA] INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
TEL: [800] 421-1404, [213] 420-5914
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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia
TEL: [03] 580-9911

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1. MECHANICAL SECTION OPERATION

Mechanical mode switching in the CT-A7 and CT-A9 is motor driven. The degree of rotational movement in the cam controlling the mechanical modes is fed back to a microcomputer in 4-bit digital code form by a rotary encoder (absolute encoder), thereby forming a loop which controls an assist motor (for mechanical mode switching) to achieve extremely stable and reliable control of the mechanical operations. (See Fig. 1-1).

The capstan motor in the CT-A9 is a quartz PLL DD motor (while the CT-A7 employs a DC servo motor belt drive mechanism). In this closed-loop dual capstan system, the sub-flywheel (left hand capstan) is belt-driven.

The reel motor is controlled by microcomputer commands corresponding to play, record/play, FF, rewind, cue (FF MS — music search), and review rewind MS) modes.

Basic Mechanical Operations

Fig. 1-2 outlines the main drive mechanism in stop mode as seen from the front. The six mechanical modes are (1) eject, (2) FF/rewind, (3) stop, (4) MS (music search), (5) pause, and (6) play.

If the mechanism is in eject or stop mode when the power is switched on, that mode is maintained. If in any other mode, however, the mechanism is returned to stop mode. All mechanical modes are switched in succession in the same order. That is, there is no jumping of the next mode (although in practice, the mechanism is switched to the next mode before operation is started for any unwanted mode).

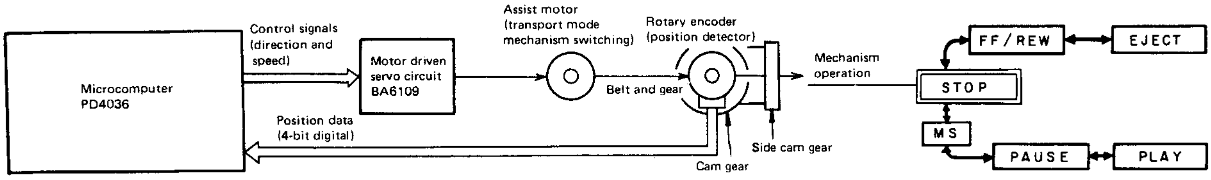

Microcomputer
PD4036
Control signals (direction and speed)
Motor driven servo circuit BA6109
Assist motor (transport mode mechanism switching)
Rotary encoder (position detector)
Belt and gear
Position data (4-bit digital)
Side cam gear
Cam gear
Mechanism operation
FF/REW
EJECT
STOP
MS
PAUSE
PLAY

Fig. 1-1 Assist motor control circuit

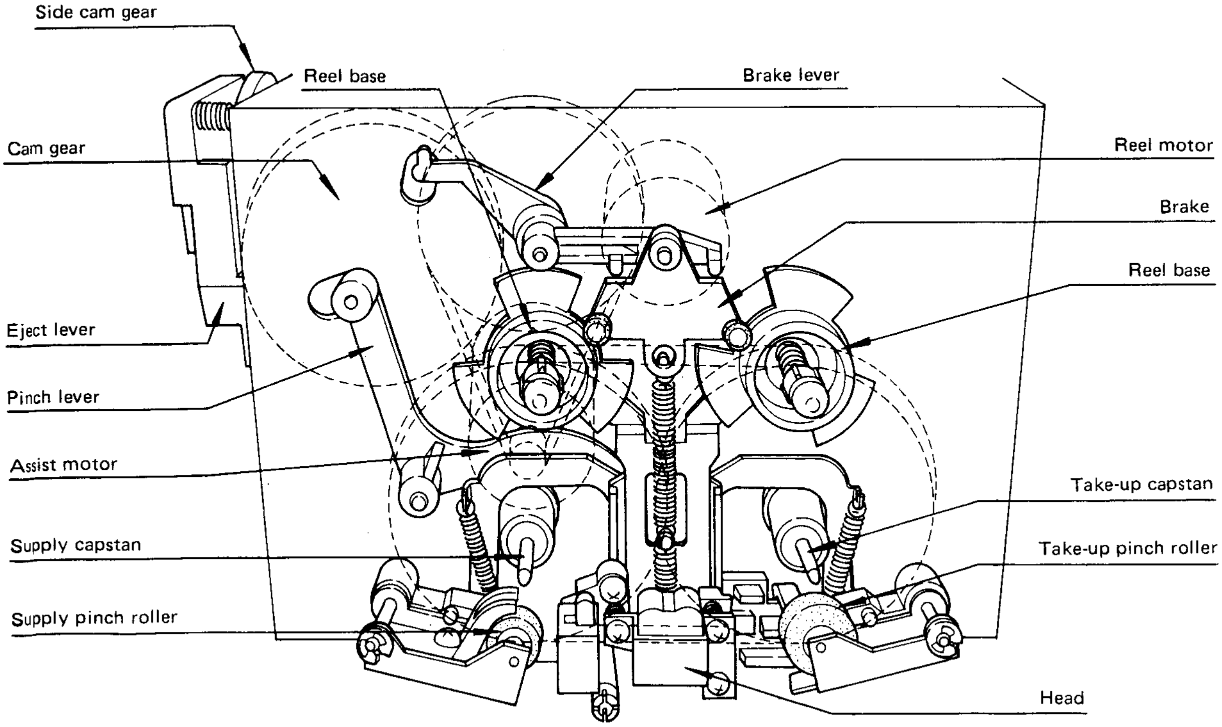
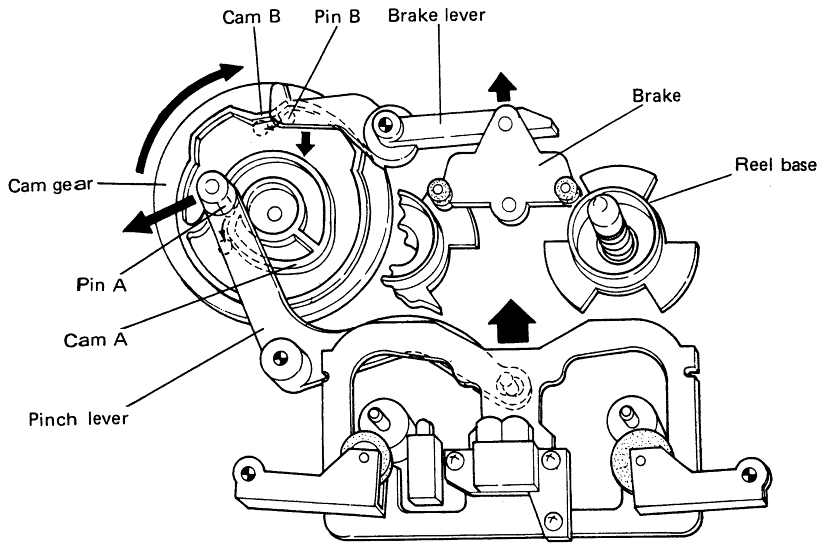

Side cam gear
Reel base
Brake lever
Cam gear
Reel motor
Brake
Reel base
Eject lever
Pinch lever
Assist motor
Take-up capstan
Supply capstan
Take-up pinch roller
Supply pinch roller
Head

Fig. 1-2 Major mechanical components
(Stop mode, frontal view)

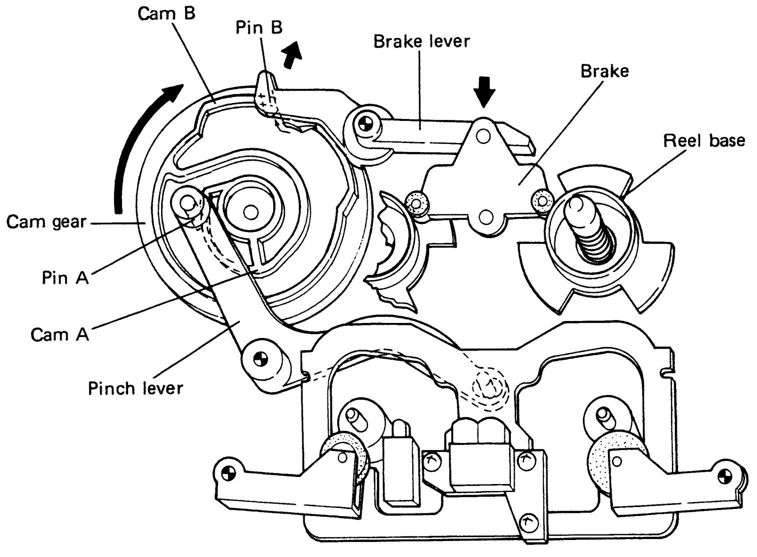
STOP → MS (Music search)

- Head raised
- Brake disengaged (off)


Cam B
Pin B
Brake lever
Brake
Reel base
Cam gear
Pin A
Cam A
Pinch lever

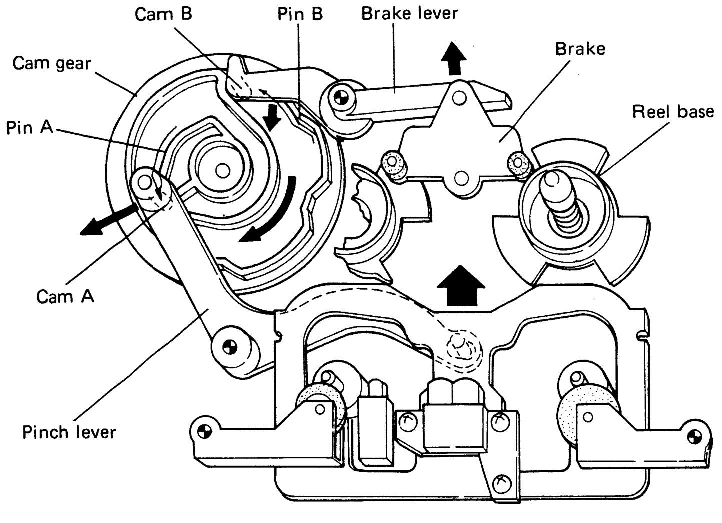
MS → PAUSE

- Brake engaged (on)


Cam B
Pin B
Brake lever
Brake
Reel base
Cam gear
Pin A
Cam A
Pinch lever

PAUSE → PLAY

- Pinch roller engaged
- Brake disengaged


Cam B
Pin B
Brake lever
Brake
Reel base
Cam gear
Pin A
Cam A
Pinch lever

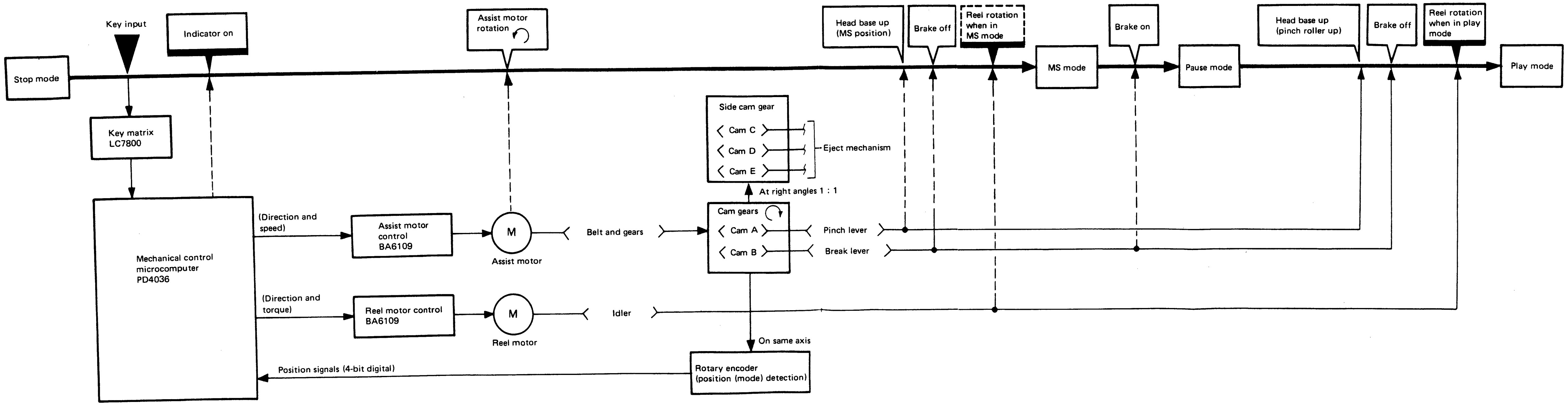
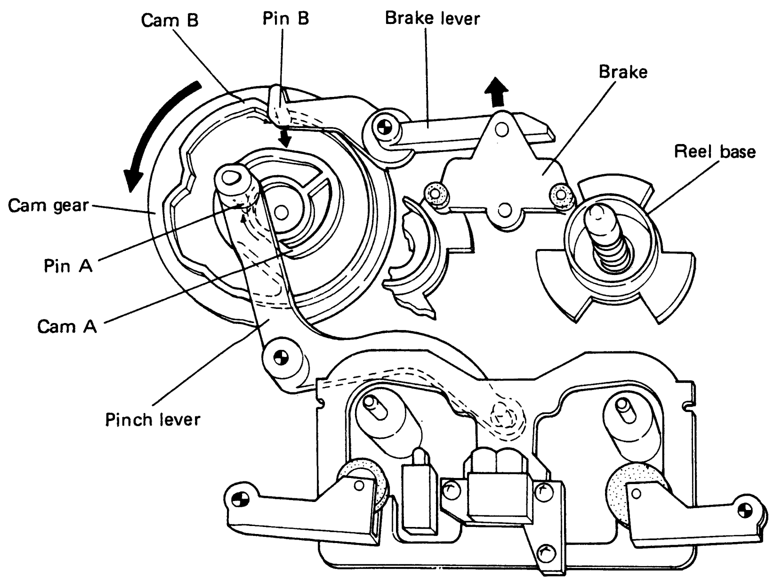

Stop mode
Key input
Indicator on
Assist motor rotation
Head base up (MS position)
Brake off
Reel rotation when in MS mode
MS mode
Brake on
Pause mode
Head base up (pinch roller up)
Brake off
Reel rotation when in play mode
Play mode
Key matrix LC7800
Side cam gear
Cam C
Cam D
Cam E
Eject mechanism
At right angles 1 : 1
Mechanical control microcomputer PD4036
(Direction and speed)
Assist motor control BA6109
M
Assist motor
Belt and gears
Cam gears
Cam A
Cam B
Pinch lever
Break lever
(Direction and torque)
Reel motor control BA6109
M
Reel motor
Idler
On same axis
Rotary encoder (position (mode) detection)
Position signals (4-bit digital)

Fig. 1-3 Assist motor forward modes
(Stop → MS → Pause → Play)

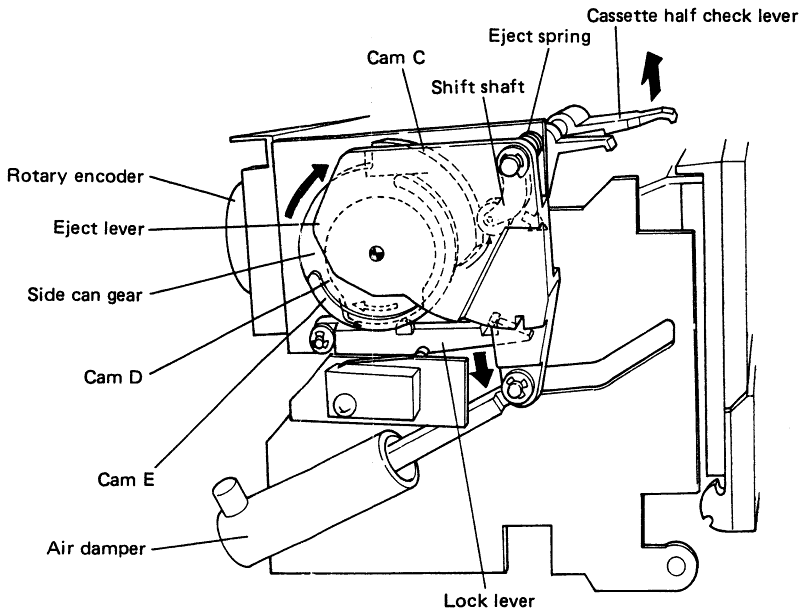
STOP → FF/REW

- Brake disengaged (off)


Cam B
Pin B
Brake lever
Brake
Reel base
Cam gear
Pin A
Cam A
Pinch lever

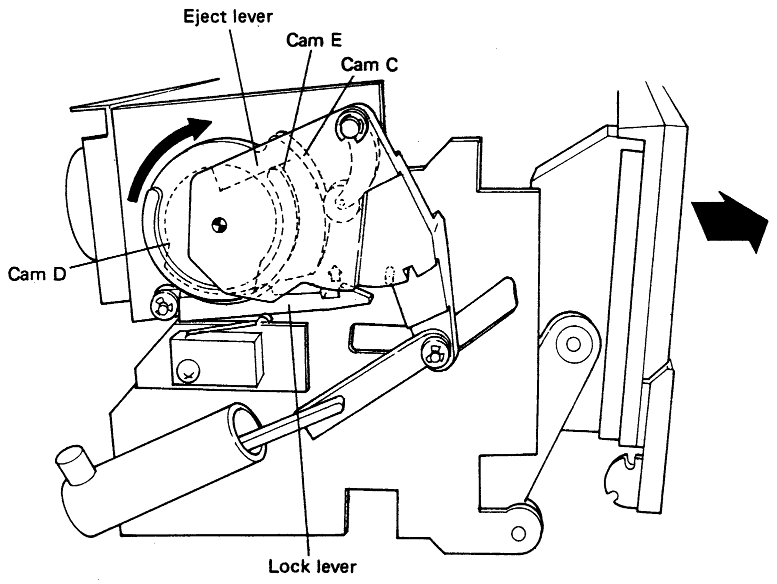
EJECT 1/3

- Cassette half check lever and detector arm moved back
- Eject lever unlocked


Cassette half check lever
Eject spring
Cam C
Shift shaft
Rotary encoder
Eject lever
Side can gear
Cam D
Cam E
Air damper
Lock lever

EJECT 2/3

- Eject action started


Eject lever
Cam E
Cam C
Cam D
Lock lever

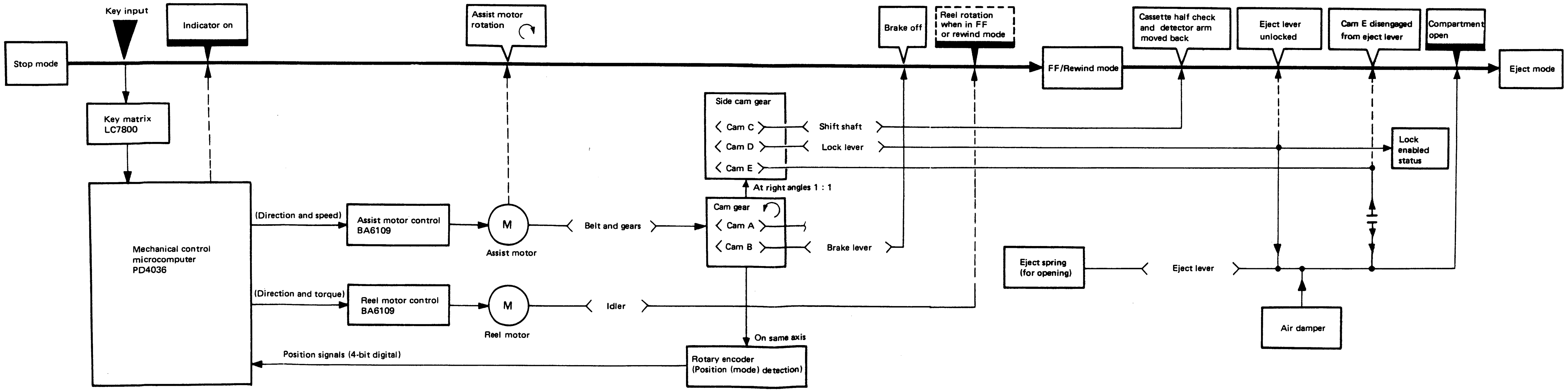
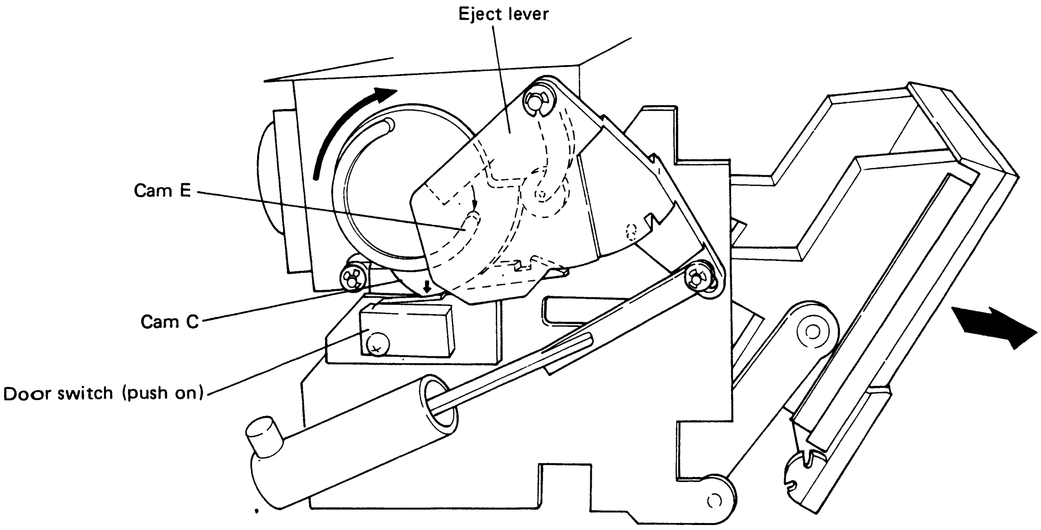

Key input
Indicator on
Assist motor rotation
Brake off
Reel rotation when in FF or rewind mode
Cassette half check and detector arm moved back
Eject lever unlocked
Cam E disengaged from eject lever
Compartment open
Stop mode
FF/Rewind mode
Eject mode
Key matrix LC7800
Side cam gear
Cam C
Cam D
Cam E
Shift shaft
Lock lever
Lock enabled status
At right angles 1 : 1
Mechanical control microcomputer PD4036
(Direction and speed)
Assist motor control BA6109
M
Assist motor
Belt and gears
Cam gear
Cam A
Cam B
Brake lever
Eject spring (for opening)
Eject lever
(Direction and torque)
Reel motor control BA6109
M
Reel motor
Idler
Air damper
On same axis
Position signals (4-bit digital)
Rotary encoder (Position (mode) detection)

Fig. 1-4 Assist motor reverse modes
(Stop → FF/rewind → eject)

EJECT 3/3

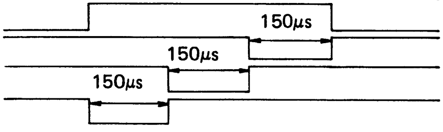
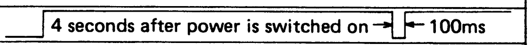
- Cam E disengaged from eject lever
- Door switch on


Eject lever
Cam E
Cam C
Door switch (push on)

> - *Precaution when replaceing heads*
>
>   *Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (CT-A9: RX X-430, CT-A7: RXX-433)* be disassembled.

2. IC TECHNICAL DATA

PD4036 (Function control)

Pin No.	Pin Name	I/O	Description
1	X2		
2	PAUSE	Output	PAUSE indicator output. H level during pause mode.
3	REC MUTE	Output	REC MUTE indicator output. H level during normal space mute mode, H/L levels alternated in 640ms cycles during space mute.
4	REC	Output	REC indicator output. H level during this mode.
5	PLAY	Output	PLAY indicator output. H level during this mode.
6	DATA 3	Input	Data input from LC7800 DATA3: KEY4, 8, 12, 16
7	DATA 2	Input	DATA2: KEY3, 7, 11, 15
8	DATA 1	Input	DATA1: KEY2, 6, 10, 14
9	DATA 0	Input	DATA0: KEY1, 5, 9, 13
10	SEL.D	Output	Data select output passed to LC7800 SEL.D, SEL.C, SEL.B, SEL.A 
11	SEL.C	Output	
12	SEL.B	Output	
13	SEL.A	Output	
14	MS IND.	Output	MS indicator output. H level during MS mode.
15	ASST SLOW	Output	Assist speed control. Low speed at H level. High speed at L level.
16	FWD	Output	Assist motor control Motor stopped when FWD is H and REV is H, Eject mode direction when FWD is L and REV is H, Playback mode direction when FWD is H and REV is L
17	REV	Output	Assist motor control
18	RESET	Input	CPU reset input. Reset by H level; normal when L level
19	OSC 1		Pin for connecting external circuit to internal clock oscillator. f = 200kHz.
20	VDD		+5V power supply
21	OSC 2		Pin for connecting external circuit to internal clock oscillator.
22	SENSING	Input	Sensing input When reel is rotating → (Pulse wave height 3.5V min.)
23	0 PULSE	Input	Counter memory pin. Detection by leading edge of input.
24	AE 0	Input	Absolute encoder inputs
25	AE 1	Input	
26	AE 2	Input	
27	AE 3	Input	
28	SONG	Input	Blank portion detector pulse input from pin 6 of BA335.
29	$\overline{\text{BLE ENABLE}}$	Output	BLE operation enable signal output. H level when enabled, L level when disabled.
30	$\overline{\text{TIMER}}$	Output	Timer recording and playback start output  4 seconds after power is switched on → ← 100ms
31	ML	Output	Reel motor control. H level during left signal output (rewind) operation.
32	MR	Output	Reel motor control. H level during right signal output (FF, playback) operation.
33	PLAY OUT	Output	Reel motor torque control. H level: playback torque, L level: FF/rewind torque.
34	SOURCE	Output	Automatic TAPE/SOURCE switching output. H level when in SOURCE position.
35	$\overline{\text{PB MUTE}}$	Output	Playback mute output. L level during playback muting.
36	$\overline{\text{LINE MUTE}}$	Output	Line mute output. L level during line muting.
37	$\overline{\text{REC MUTE}}$	Output	Record mute output. L level during recording muting.
38	$\overline{\text{BIAS}}$	Output	Bias oscillator control output. L level during bias oscillation.
39	GND		Ground
40	X1		

* Key scan every 20ms.
* Data reading executed 50μs after SEL switching.

	EJECT	FF/REW	STOP	MS	PAUSE	PLAY
AE 0	H	H	L	H	L	L
AE 1	L	L	L	H	H	L
AE 2	L	H	H	H	L	L
AE 3	H	H	L	L	L	L

Fig. 2-1 PD4036 pin description

LC7800 (Output port expander)

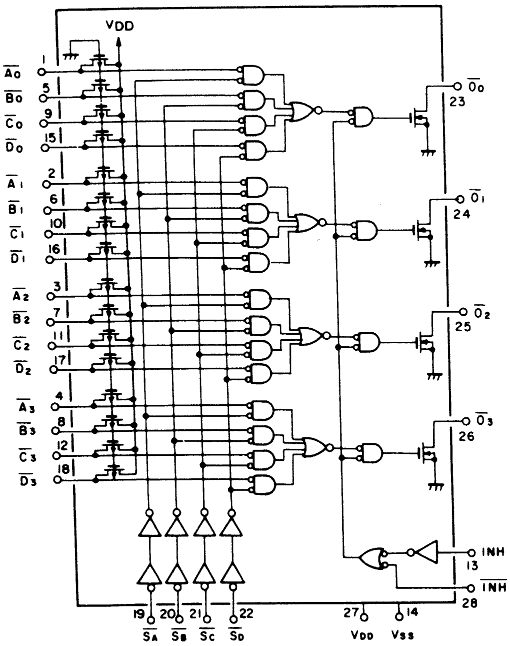

VDD
$\overline{A_0}$
$\overline{B_0}$
$\overline{C_0}$
$\overline{D_0}$
$\overline{A_1}$
$\overline{B_1}$
$\overline{C_1}$
$\overline{D_1}$
$\overline{A_2}$
$\overline{B_2}$
$\overline{C_2}$
$\overline{D_2}$
$\overline{A_3}$
$\overline{B_3}$
$\overline{C_3}$
$\overline{D_3}$
1
5
9
15
2
6
10
16
3
7
11
17
4
8
12
18
$\overline{O_0}$
23
$\overline{O_1}$
24
$\overline{O_2}$
25
$\overline{O_3}$
26
INH
13
$\overline{INH}$
28
19
20
21
22
$\overline{S_A}$
$\overline{S_B}$
$\overline{S_C}$
$\overline{S_D}$
27
14
VDD
VSS

Fig. 2-2 Equivalent circuit of LC7800

INPUT																					OUTPUT			
DATA INPUT																SELECT INPUT				INHIBIT INPUT					
A				B				C				D													
$\overline{A0}$	$\overline{A1}$	$\overline{A2}$	$\overline{A3}$	$\overline{B0}$	$\overline{B1}$	$\overline{B2}$	$\overline{B3}$	$\overline{C0}$	$\overline{C1}$	$\overline{C2}$	$\overline{C3}$	$\overline{D0}$	$\overline{D1}$	$\overline{D2}$	$\overline{D3}$	$\overline{SA}$	$\overline{SB}$	SC	$\overline{SD}$	INH	$\overline{INH}$	$\overline{O0}$	$\overline{O1}$	$\overline{O2}$	$\overline{O3}$
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	0
1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0
1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1
1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	0
1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	0	1	1	1	1
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	*	1	1	1	1
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	1	1	1	1

NOTE : 1 : ｢H｣ LEVEL / 0 : ｢L｣ LEVEL / * : DON'T CARE

Fig. 2-3 Truth table of LC7800

BA335 (MS detector)

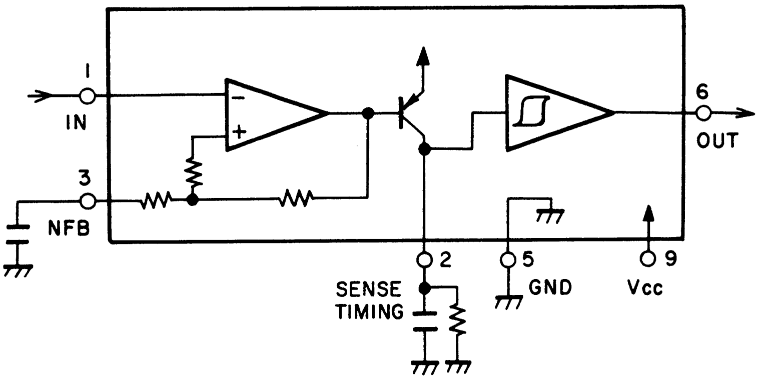

1
IN
3
NFB
−
+
6
OUT
2
5
9
SENSE
TIMING
GND
Vcc

Fig. 2-4 Block diagram of BA335

BA6109 (Motor control)

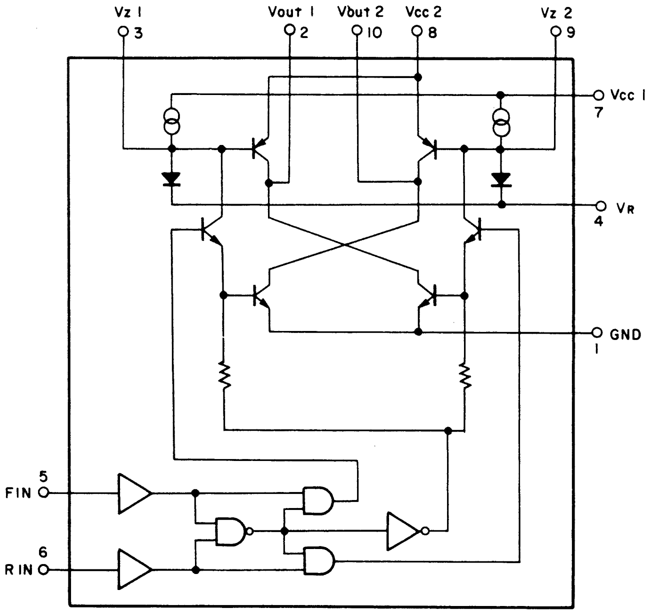


Fig. 2-5 Equivalent circuit of BA6109

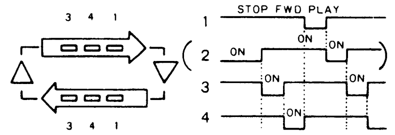
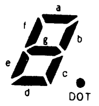
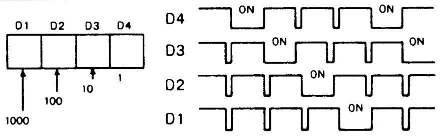
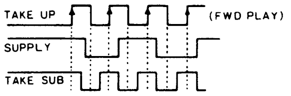
Pin No.	Symbol	I/O	Description	
1	GND		GND	
2	VOUT1	OUT	Motor output (1)	
3	Vz1		Output drive (1)	
4	VR		Output voltage setting	
5	F IN	IN	Input which sets V OUT 1 to "H"	"L" → 0.7V or less
6	R IN	IN	Input which sets V OUT 2 to "H"	"H" → 2V or greater
7	VCC1		+B	
8	VCC2		Power supply	
9	Vz2		Output drive (2)	
10	VOUT2	OUT	Motor output (2)	

Fig. 2-6 BA6109 pin description

Motor Current Direction	INPUT		OUTPUT			
	F IN	R IN	Vz1	OUT1	Vz2	V OUT2
No current flow	H	H	H	L	H	L
⑩ → ②	L	H	H	L	L	H
② → ⑩	H	L	L	H	H	L
No current flow	L	L	H	L	H	L

Fig. 2-7 Truth table of BA6109

PD6008A (Tape counter driver in CT-A9)

Pin No.	Symbol	I/O Status	Description	Use
1	Extal		Pins for connecting external circuit for built-in clock generator. f=3.58MHz. Waveform obtained between pin 2 ground.	O
2	Xtal			O
3	RESET	Input	CPU reset input – reset by L level. Normally at H level.	O
4	IRQ		Not used.	X
5	SO			X
6	SI			X
7	SC/TO			X
8	TC			X
9	TAPE RUN OUT 1	Output	Tape travel indicator 1.  3 4 1 3 4 1 STOP FWD PLAY 1 2 3 4 ON ON ON ON ON ON	X
10	TAPE RUN OUT 2	Output	Tape travel indicator 2.	X
11	TAPE RUN OUT 3	Output	Tape travel indicator 3.	X
12	TAPE RUN OUT 4	Outpur	Tape travel indicator 4.	X
13	SEGMENT DATA a	Output	Segment data a. ON at H level. 	O
14	SEGMENT DATA b	Output	Segment data b. ON at H level.	O
15	SEGMENT DATA c	Output	Segment data c. ON at H level.	O
16	SEGMENT DATA d	Output	Segment data d. ON at H level.	O
17	SEGMENT DATA e	Output	Segment data e. ON at H level.	O
18	SEGMENT DATA f	Output	Segment data f. ON at H level.	O
19	SEGMENT DATA g	Output	Segment data g. ON at H level.	O
20	—"— —"— DOT	Output	Segment data dot. ON at H level.	O
21	GND		Ground.	O
22	Rφ		Not used.	X
23	RI	Input	CPU test program input. Fixed to H level.	X
24	TAPE RUN SELECT	Input	Tape transport indicated speed switching. H: low speed. L: high speed. Fixed to H level.	X
25	COUNTER φ PULSE	Output	L level output when tape counter at 0000. Normally at H level. These otuputs are obtained irrespective of the indicated mode. (for TAPE RETURN operation).	O
26	DIGIT 4	Output	DIGIT output 4.  D1 D2 D3 D4 1000 100 10 1 D4 D3 D2 D1 ON ON ON ON ON ON	O
27	DIGIT 3	Output	DIGIT output 3.	O
28	DIDIT 2	Output	DIGIT output 2.	O
29	DIGIT 1	Output	DIGIT output 1.	O
30	TAKE-UP	Input	Reel rotation sensing pulse input. 	O
31	SUPPLY	Input	Reel rotation sensing pulse input.	O
32	TAKE SUB	Input	Reel rotation sensing pulse input.	O
33	FWD/REV	Input	H level when mechanical mode is REV, and L level when FWD.	O
34	PLAY	Input	L level when mechanical mode is PLAY, REC, PLAY-PAUSE, or REC-PAUSE.	O
35	FF	Input	L level when mechanical mode is FF.	O
36	REW	Input	L level when mechanical mode is REW.	O
37	PAUSE	Input	L level when mechanical mode is PLAY-PAUSE, REC-PAUSE, or PAUSE.	O
38	TAPE SELECTOR 1	Input	Tape time selector switch input 1.	O
39	TAPE SELECTOR 2	Input	Tape time selector switch input 2.	O
40	DISPLAY MODE	Input	Counter display mode selector switch input. L level when switch in ON. Real-time counter ⟷ tape counter.	O
41	COUNTER RESET	Input	Tape counter reset switch input. L level when switch in ON.	O
42	Vcc		+5V power supply.	O

	C-46L	C-46	C-60	C-90
Pin 38	L	L	H	H
Pin 39	L	H	L	H

Fig. 2-8 PD6008A pin description

PD4037 (BLE control in CT-A9)

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>I/O</th><th colspan="9">Description</th></tr>
<tr><td>1</td><td>CL1</td><td></td><td colspan="9">Pin for connecting external LC tank circuit to internal clock oscillator.</td></tr>
<tr><td>2</td><td>A/D1</td><td>In/Out</td><td colspan="9" rowspan="4">A/D converter data output/Operation mode command input.</td></tr>
<tr><td>3</td><td>A/D2</td><td>In/Out</td></tr>
<tr><td>4</td><td>A/D3</td><td>In/Out</td></tr>
<tr><td>5</td><td>A/D4</td><td>In/Out</td></tr>
<tr><td>6</td><td>$\overline{\text{SENSING}}$</td><td>Input</td><td colspan="9">Take-up reel pulse input (tape transport detector) </td></tr>
<tr><td>7</td><td>CLEAR</td><td>Input</td><td colspan="9">BLE data reset pin. Reset by H, normal at L</td></tr>
<tr><td>8</td><td>CK 1</td><td>Output</td><td colspan="9">Bias data transfer clock output (H)</td></tr>
<tr><td>9</td><td>CK 2</td><td>Output</td><td colspan="9">Recording level data transfer clock output (H)</td></tr>
<tr><td>10</td><td>CK 3</td><td>Output</td><td colspan="9">Left channel recording equalizer data transfer clock output (H)</td></tr>
<tr><td>11</td><td>CK 4</td><td>Output</td><td colspan="9">Right channel recording equalizer data transfer clock output (H)</td></tr>
<tr><td>12</td><td>A/D5</td><td>Output</td><td colspan="9">A/D converter data output</td></tr>
<tr><td>13</td><td>P RES</td><td>Output</td><td colspan="9">A/D converter peak hold reset pulse output (H)</td></tr>
<tr><td>14</td><td>$\overline{\text{MUTE}}$</td><td>Output</td><td colspan="9">BLE muting output. L level during BLE (line output muting, test tone on, PM9001A operation mode command input inhibited).</td></tr>
<tr><td>15</td><td>OSC CONT</td><td>Output</td><td colspan="9">Test tone switching control. H: 1kHz, L: 10kHz</td></tr>
<tr><td>16</td><td>EQXL 1</td><td>Output</td><td colspan="9">Left channel equalizer adjustment range extension output (H)</td></tr>
<tr><td>17</td><td>EQXL 2</td><td>Output</td><td colspan="9">Left channel equalizer adjustment range extension output (H)</td></tr>
<tr><td>18</td><td>EQXR 1</td><td>Output</td><td colspan="9">Right channel equalizer adjustment range extension output (H)</td></tr>
<tr><td>19</td><td>EQXR 2</td><td>Output</td><td colspan="9">Right channel equalizer adjustment range extension output (H)</td></tr>
<tr><td>20</td><td>TEST</td><td></td><td colspan="9">CPU test input (fixed to H)</td></tr>
<tr><td>21</td><td>Vss</td><td></td><td colspan="9">Positive power supply (+5V)</td></tr>
<tr><td>22</td><td>D/A DATA</td><td>Output</td><td colspan="9">Bias, level, and equalizer data outputs (synchronized with CK1 thru CK4)</td></tr>
<tr><td>23</td><td>MC 1</td><td>Output</td><td>Mechanical control output</td><td>H</td><td rowspan="2">STOP</td><td>H</td><td rowspan="2">REW</td><td>L</td><td rowspan="2">REC</td><td>L</td><td rowspan="2">Normal</td></tr>
<tr><td>24</td><td>MC 2</td><td>Output</td><td>Mechanical control output</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>25</td><td>BX 1</td><td>Output</td><td>Bias control output</td><td>H</td><td>UNDER</td><td>H</td><td>PEAK</td><td>L</td><td rowspan="2">Not used</td><td>L</td><td>OVER</td></tr>
<tr><td>26</td><td>BX 2</td><td>Output</td><td>Bias control output</td><td>H</td><td>BIAS</td><td>L</td><td>BIAS</td><td>H</td><td>L</td><td>BIAS</td></tr>
<tr><td>27</td><td>O DISP</td><td>Output</td><td colspan="9">Over BIAS indicator output (H). H/L alternated during OVER BIAS BLE operation.</td></tr>
<tr><td>28</td><td>P DISP</td><td>Output</td><td colspan="9">PEAK BIAS indicator output (H). H/L alternated during PEAK BIAS BLE operation.</td></tr>
<tr><td>29</td><td>U DISP</td><td>Output</td><td colspan="9">UNDER BIAS indicator output (H). H/L alternated during UNDER BIAS BLE operation.</td></tr>
<tr><td>30</td><td>B DISP</td><td>Output</td><td colspan="9">BIAS adjustment indicator output. H level while BLE bias is being adjusted.</td></tr>
<tr><td>31</td><td>L DISP</td><td>Output</td><td colspan="9">LEVEL adjustment indicator output. H level while BLE level is being adjusted.</td></tr>
<tr><td>32</td><td>E DISP</td><td>Output</td><td colspan="9">EQ adjustment indicator output. H level while BLE equalization is being adjusted.</td></tr>
<tr><td>33</td><td>COMP L</td><td>Input</td><td colspan="9">Input pin for A/D converter comparator output (left channel)</td></tr>
<tr><td>34</td><td>COMP R</td><td>Input</td><td colspan="9">Input pin for A/D converter comparator output (right channel)</td></tr>
<tr><td>35</td><td>$\overline{\text{REC}}$</td><td>Input</td><td colspan="9">Recording operation check input (L)</td></tr>
<tr><td>36</td><td>$\overline{\text{REW}}$</td><td>Input</td><td colspan="9">Rewind operation check input (L)</td></tr>
<tr><td>37</td><td>$\overline{\text{O BLE}}$</td><td>Input</td><td colspan="9">OVER BIAS BLE start input (L)</td></tr>
<tr><td>38</td><td>$\overline{\text{P BLE}}$</td><td>Input</td><td colspan="9">PEAK BIAS BLE start input (L)</td></tr>
<tr><td>39</td><td>$\overline{\text{U BLE}}$</td><td>Input</td><td colspan="9">UNDER BIAS BLE start input (L)</td></tr>
<tr><td>40</td><td>$\overline{\text{CROM}}$</td><td>Input</td><td colspan="9">Tape type input.</td></tr>
<tr><td>41</td><td>V_{GG}</td><td></td><td colspan="9">Negative power supply (–5V)</td></tr>
<tr><td>42</td><td>CLO</td><td></td><td colspan="9">Pin for connecting external LC tank circuit to internal clock oscillator</td></tr>
</table>

Fig. 2-9 PD4037 pin description

PM9001A (BLE input/output extension D/A & A/D conversion in CT-A9)

Pin No.	Pin Name	I/O	Description	
1	$\overline{\text{IN INH}}$	Input	Input pins for A/D1 thru A/D4 transfer data control. Data input for "L" → A/D conversion (AUTO and TEST A thru C pin inputs inhibited).	
2	Vcc		Positive power supply (+5V)	
3	A/D5	Input	A/D conversion data input	MSB
4	CK 4	Input	Clock input for right channel recording equalizer setting	Clock inputs for D/A data (serial data) time sharing latching
5	CK 3	Input	Clock input for left channel recording equalizer setting	
6	CK 2	Input	Clock input for recording level setting	
7	CK 1	Input	Clock input for bias current setting	
8	A/D3	In/Out	A/D conversion data input/Operation indicator data output	↑
9	A/D3	In/Out		
10	A/D2	In/Out		
11	A/D1	In/Out		LSB
12	GND		Ground	
13	A-M		A/D conversion offset setting pin	
14	P-RES	Input	A/D conversion playback input signal peak hold reset input. "H" → Reset	
15	ARO2		Peak hold element connector pins	
16	ALO2			
17	ARO1			
18	ALO1			
19	AR IN	Input	Right channel playback signal input pin	
20	AL IN	Input	Left channel playback signal input pin	
21	V_{EE}		Negative power supply (–5V)	
22	EQ RO4		Right channel recording equalizer variable capacitor connector pin	MSB
23	EQ RO3			↑
24	EQ RO2			
25	EQ RO1			LSB
26	EQ RO4		Left channel recording equalizer variable capacitor connector pin	MSB
27	EQ LO3			↑
28	EQ LO2			
29	EQ LO1			LSB
30	LEVEL R0		Right channel recording level variable programmable attenuator	
31	LEVEL L0		Left channel recording level variable programmable attenuator	
32	BIAS 0		Recording bias variable programmable attenuator	
33	$\overline{\text{AUTO}}$	Input	Timer recording OVER BIAS BLE start input	"L" active
34	TEST C	Input	Test mode start input	"L" active
35	$\overline{\text{TEST B}}$	Input	Timer recording PEAK BIAS BLE start input	"L" active
36	$\overline{\text{TEST A}}$	Input	Timer recording UNDER BIAS BLE start input	"L" active
37	$\overline{\text{D/A RES}}$	Input	Latch data clear input	"L" active
38	D/A DATA	Input	BLE setting serial data input	
39	COMP R	Output	Right channel A/D conversion comparator output	
40	COMP L	Output	Left channel A/D conversion comparator output	

Fig. 2-10 PM9001A pin description

AN6870N (Level meter driver in CT-A7)

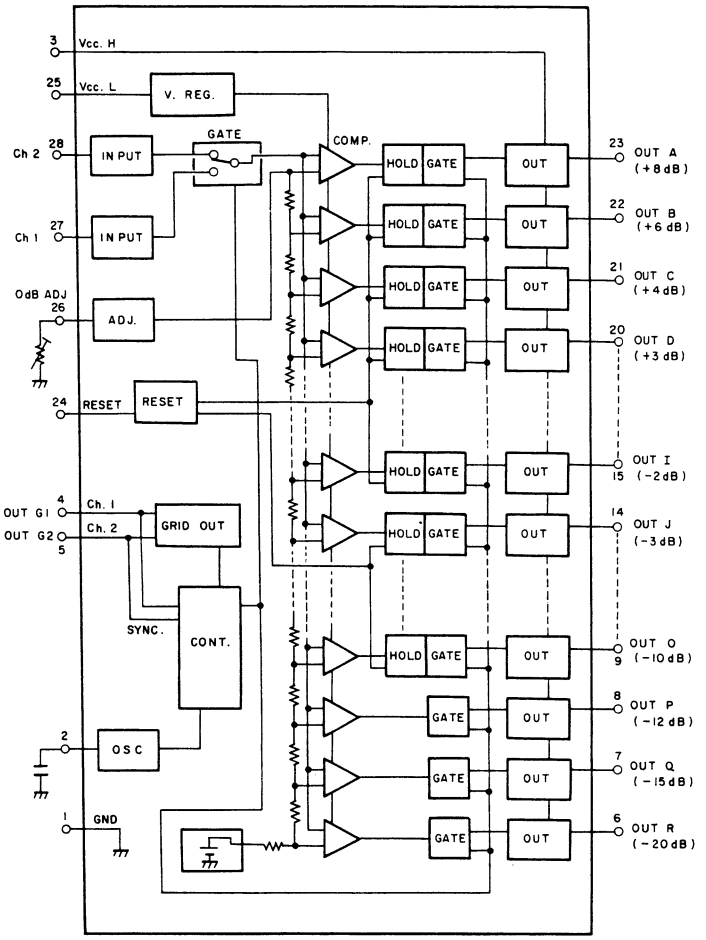

3
Vcc. H
25
Vcc. L
V. REG.
Ch 2
28
IN PUT
GATE
COMP.
Ch 1
27
IN PUT
OdB ADJ
26
ADJ.
24
RESET
RESET
OUT G1
4
OUT G2
5
Ch. 1
Ch. 2
GRID OUT
SYNC.
CONT.
2
OSC
1
GND
HOLD
GATE
OUT
23
OUT A
(+8dB)
22
OUT B
(+6 dB)
21
OUT C
(+4dB)
20
OUT D
(+3 dB)
OUT I
15
(-2dB)
14
OUT J
(-3dB)
OUT O
9
(-10dB)
8
OUT P
(-12 dB)
7
OUT Q
(-15dB)
6
OUT R
(-20dB)

Fig. 2-11 Equivalent circuit of AN6870N

HA12010 (Level meter driver in CT-A9)

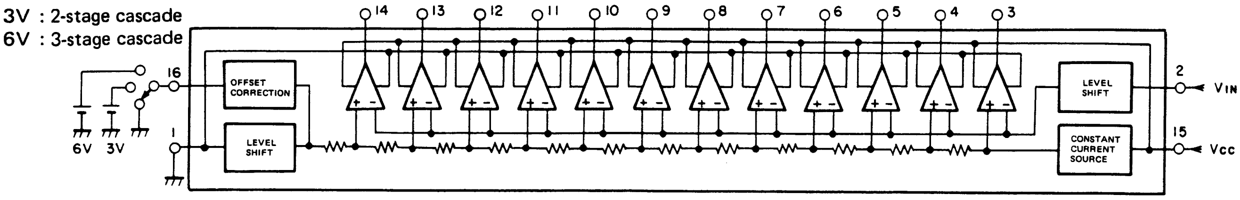
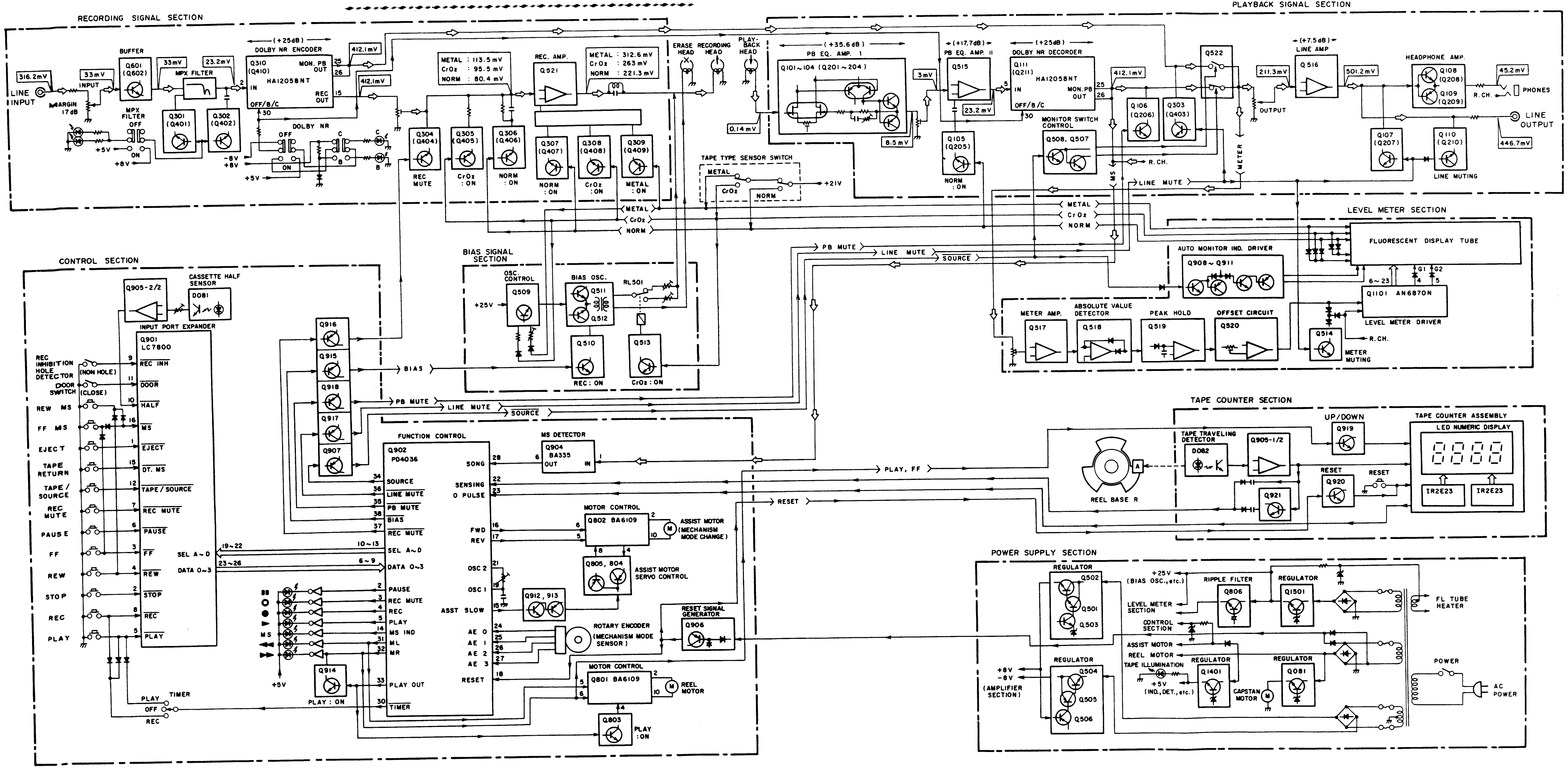

3V : 2-stage cascade
6V : 3-stage cascade
16
1
6V
3V
OFFSET CORRECTION
LEVEL SHIFT
14
13
12
11
10
9
8
7
6
5
4
3
LEVEL SHIFT
CONSTANT CURRENT SOURCE
2
VIN
15
Vcc

Fig. 2-12 Equivalent circuit of HA12010

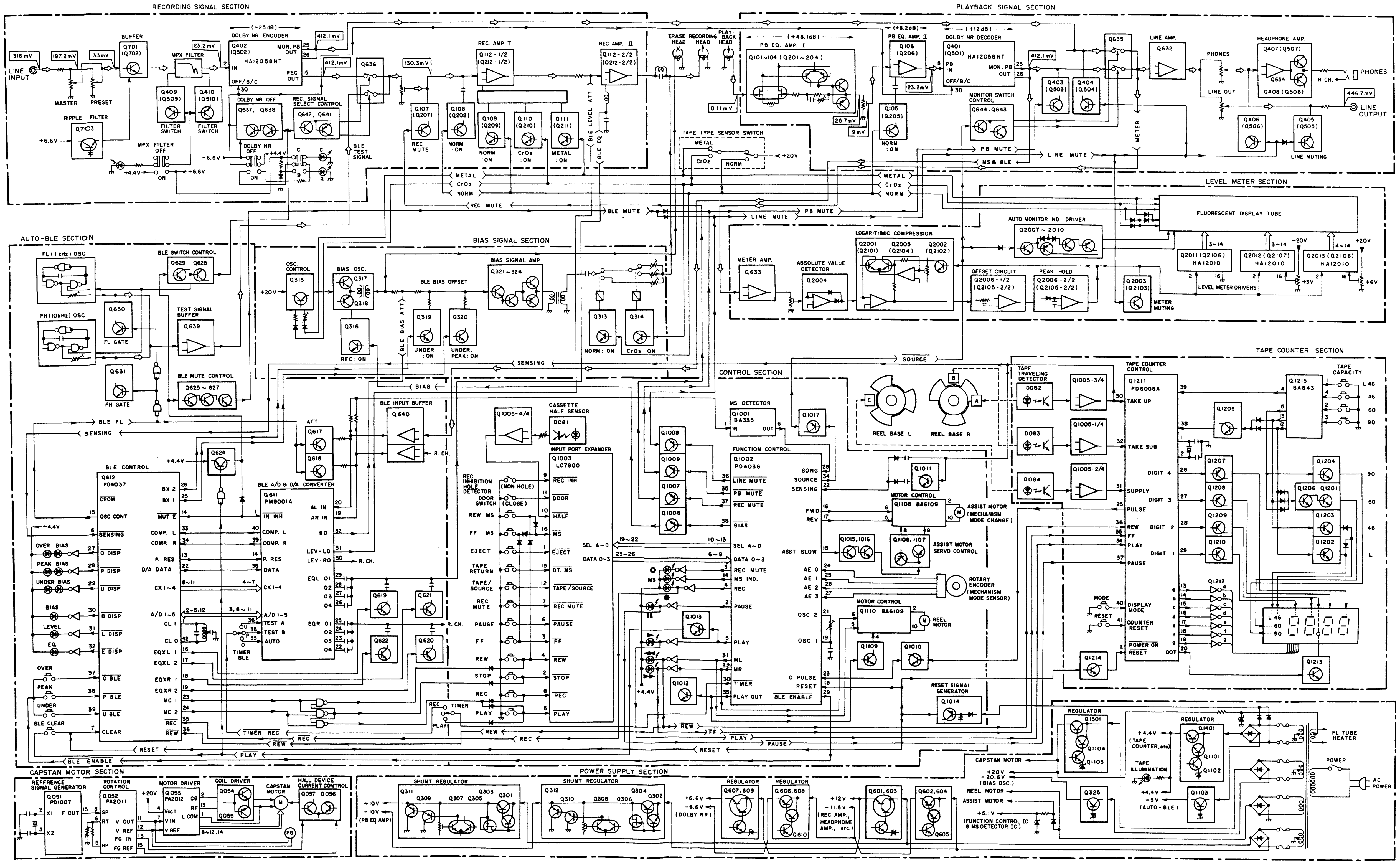
3. BLOCK DIAGRAM

CT-A7

"Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise Reduction manufactured under license from Dobly Laboratories Licensing Corporation.


RECORDING SIGNAL SECTION
PLAYBACK SIGNAL SECTION
LINE INPUT
316.2mV
33mV
INPUT
MARGIN 17dB
BUFFER
Q601 (Q602)
33mV
23.2mV
MPX FILTER
MPX FILTER OFF ON
Q301 (Q401)
Q302 (Q402)
+5V
+8V
-8V
(+25dB)
DOLBY NR ENCODER
Q310 (Q410)
HA12058NT
MON. PB OUT
REC OUT
OFF/B/C
IN
412.1mV
DOLBY NR
OFF C B ON
METAL : 113.5mV
CrO2 : 95.5mV
NORM : 80.4mV
REC. AMP.
Q521
METAL : 312.6mV
CrO2 : 263mV
NORM : 221.3mV
Q304 (Q404)
Q305 (Q405)
Q306 (Q406)
REC MUTE
CrO2 : ON
NORM : ON
Q307 (Q407)
Q308 (Q408)
Q309 (Q409)
NORM : ON
CrO2 : ON
METAL : ON
ERASE HEAD
RECORDING HEAD
PLAY-BACK HEAD
0.14mV
TAPE TYPE SENSOR SWITCH
METAL
CrO2
NORM
+21V
(+35.6dB)
PB EQ. AMP. I
Q101~104 (Q201~204)
3mV
8.5mV
(+17.7dB)
PB EQ. AMP. II
Q515
23.2mV
Q105 (Q205)
NORM : ON
(+25dB)
DOLBY NR DECORDER
Q111 (Q211)
HA12058NT
MON. PB OUT
OFF/B/C
412.1mV
MONITOR SWITCH CONTROL
Q508, Q507
Q106 (Q206)
Q303 (Q403)
R.CH.
Q522
OUTPUT
METER
MS
LINE MUTE
(+7.5dB)
LINE AMP
Q516
211.3mV
501.2mV
HEADPHONE AMP.
Q108 (Q208)
Q109 (Q209)
45.2mV
R.CH.
PHONES
LINE OUTPUT
446.7mV
Q107 (Q207)
Q110 (Q210)
LINE MUTING
METAL
CrO2
NORM
LEVEL METER SECTION
FLUORESCENT DISPLAY TUBE
AUTO MONITOR IND. DRIVER
Q908~Q911
6~23
G1
G2
Q1101 AN6870N
LEVEL METER DRIVER
METER AMP.
Q517
ABSOLUTE VALUE DETECTOR
Q518
PEAK HOLD
Q519
OFFSET CIRCUIT
Q520
Q514
R.CH.
METER MUTING
PB MUTE
LINE MUTE
SOURCE
BIAS SIGNAL SECTION
OSC. CONTROL
Q509
+25V
BIAS OSC.
Q511
Q512
RL501
Q510
REC : ON
Q513
CrO2 : ON
CONTROL SECTION
Q905-2/2
CASSETTE HALF SENSOR
D081
INPUT PORT EXPANDER
Q901 LC7800
REC INHIBITION HOLE DETECTOR
(NON HOLE)
DOOR SWITCH
(CLOSE)
REW MS
FF MS
EJECT
TAPE RETURN
TAPE/SOURCE
REC MUTE
PAUSE
FF
REW
STOP
REC
PLAY
REC INH
DOOR
HALF
MS
EJECT
DT. MS
TAPE / SOURCE
REC MUTE
PAUSE
FF
REW
STOP
REC
PLAY
SEL A~D
DATA 0~3
19~22
23~26
PLAY
OFF
REC
TIMER
Q916
Q915
Q918
Q917
Q907
BIAS
PB MUTE
LINE MUTE
SOURCE
FUNCTION CONTROL
Q902 PD4036
SOURCE
LINE MUTE
PB MUTE
BIAS
REC MUTE
SEL A~D
DATA 0~3
PAUSE
REC MUTE
REC
PLAY
MS IND
ML
MR
PLAY OUT
TIMER
SONG
SENSING
O PULSE
FWD
REV
OSC 2
OSC 1
ASST SLOW
AE 0
AE 1
AE 2
AE 3
RESET
10~13
6~9
MS
+5V
Q914
PLAY : ON
MS DETECTOR
Q904 BA335
OUT
IN
MOTOR CONTROL
Q802 BA6109
ASSIST MOTOR (MECHANISM MODE CHANGE)
Q805, 804
ASSIST MOTOR SERVO CONTROL
Q912, 913
ROTARY ENCODER (MECHANISM MODE SENSOR)
RESET SIGNAL GENERATOR
Q906
MOTOR CONTROL
Q801 BA6109
REEL MOTOR
Q803
PLAY : ON
PLAY, FF
RESET
TAPE COUNTER SECTION
TAPE TRAVELING DETECTOR
D082
Q905-1/2
UP/DOWN
Q919
RESET
Q920
Q921
REEL BASE R
TAPE COUNTER ASSEMBLY
LED NUMERIC DISPLAY
IR2E23
IR2E23
POWER SUPPLY SECTION
REGULATOR
Q502
Q501
Q503
+25V (BIAS OSC., etc.)
LEVEL METER SECTION
CONTROL SECTION
ASSIST MOTOR
REEL MOTOR
TAPE ILLUMINATION
+5V (IND., DET., etc.)
RIPPLE FILTER
Q806
REGULATOR
Q1501
REGULATOR
Q1401
CAPSTAN MOTOR
REGULATOR
Q081
FL TUBE HEATER
POWER
AC POWER
REGULATOR
Q504
Q505
Q506
+8V
-8V
(AMPLIFIER SECTION)

CT-A9


RECORDING SIGNAL SECTION
PLAYBACK SIGNAL SECTION
LINE INPUT
MASTER
PRESET
RIPPLE FILTER
BUFFER
MPX FILTER
DOLBY NR ENCODER
HA12058NT
REC. AMP I
REC. AMP II
ERASE HEAD
RECORDING HEAD
PLAY-BACK HEAD
PB EQ. AMP. I
PB EQ. AMP. II
DOLBY NR DECODER
LINE AMP.
HEADPHONE AMP.
PHONES
LINE OUT
LINE OUTPUT
LINE MUTING
TAPE TYPE SENSOR SWITCH
MONITOR SWITCH CONTROL
LEVEL METER SECTION
FLUORESCENT DISPLAY TUBE
AUTO MONITOR IND. DRIVER
LOGARITHMIC COMPRESSION
METER AMP.
ABSOLUTE VALUE DETECTOR
OFFSET CIRCUIT
PEAK HOLD
LEVEL METER DRIVERS
METER MUTING
AUTO-BLE SECTION
FL (1kHz) OSC
FH (10kHz) OSC
FL GATE
FH GATE
BLE SWITCH CONTROL
TEST SIGNAL BUFFER
BLE MUTE CONTROL
BIAS SIGNAL SECTION
OSC. CONTROL
BIAS OSC.
BLE BIAS OFFSET
BIAS SIGNAL AMP.
BLE CONTROL
Q612 PD4037
BLE A/D & D/A CONVERTER
Q611 PM9001A
BLE INPUT BUFFER
ATT
CASSETTE HALF SENSOR
INPUT PORT EXPANDER
Q1003 LC7800
CONTROL SECTION
MS DETECTOR
Q1001 BA335
FUNCTION CONTROL
Q1002 PD4036
MOTOR CONTROL
Q1108 BA6109
ASSIST MOTOR (MECHANISM MODE CHANGE)
ASSIST MOTOR SERVO CONTROL
ROTARY ENCODER (MECHANISM MODE SENSOR)
Q1110 BA6109
REEL MOTOR
RESET SIGNAL GENERATOR
REEL BASE L
REEL BASE R
TAPE COUNTER SECTION
TAPE TRAVELING DETECTOR
TAPE COUNTER CONTROL
Q1211 PD6008A
TAPE CAPACITY
Q1215 BA843
CAPSTAN MOTOR SECTION
REFFRENCE SIGNAL GENERATOR
Q051 PD1007
ROTATION CONTROL
Q052 PA2011
MOTOR DRIVER
Q053 PA2012
COIL DRIVER
CAPSTAN MOTOR
HALL DEVICE CURRENT CONTROL
POWER SUPPLY SECTION
SHUNT REGULATOR
REGULATOR
FL TUBE HEATER
POWER
AC POWER

4. CIRCUIT DESCRIPTIONS

The basic circuitry in both CT-A9 and CT-A7 is much the same. The main difference in the mechanism is that where the CT-A9 is equipped with a quartz PLL DD capstan motor and a coreless reel motor, the CT-A7 is belt-driven by a DC servo motor and DC reel motor. In both decks, tape transport is controlled by a closed-loop dual capstan system. The electrical differences lie in the additional functions. The CT-A9 features MOL balance control type AUTO BLE and a real-time tape counter, and includes 35 steps in the level meter display where the CT-A7 has 18.

4.1 OUTLINE OF SIGNAL PATHS

Playback Equalizer Amplifier I (Q101~104, Q201~204)

Dual-FET dual-transistor two-stage differential amplifier, SEPP output stage, and 70μs equalizer time constant.

Playback Equalizer Amplifier II (Q515, 105, 205)

Incorporating low-noise operational amplifiers, this circuit handles playback sensitivity compensation, Dolby NR stage matching, and 120μs equalizer time constant switching (for NORM tapes).

*** Shunt regulator (used in the CT-A9 playback equalizer amplifier power supply).**

This shunt regulator contains a constant current circuit used in parallel control to maintain the current at a constant level when the load current is changed. The power supply impedance is therefore very low, while distortion and crosstalk from other circuits via the power supply are also greatly reduced.

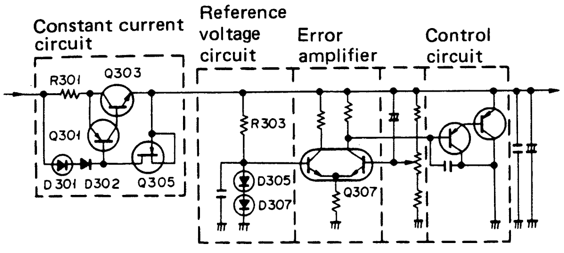


Fig. 4-1 Shunt regulator

Playback Dolby NR Section (Q401 & Q501 in CT-A9, and Q111 and Q211 in CT-A7)

HA12058NT-01 (Note) is used as the Dolby NR B/C IC, and operation is in conformity with PA3012.

NOTE:
Since encoding and decoding are executed in separate ICs, operational characteristics must be organized selectively. There are six specific ranks.

Line Output Amplifier (Q632 in CT-A9, and Q516 in CT-A7)

Low-noise operational amplifiers.

Headphone Amplifier

*** CT-A9 (Q634, 407, 408, 507, 508)**

Operational amplifiers in the input stage, and SEPP composition in the output stage. Separate level controls.

*** CT-A7 (Q108, 109, 208, 209)**

The same circuitry is used in CT-A9 with the exception of the level control.

Lind Input Buffer (Q701 and Q702 in CT-A9, and Q601 and Q602 in CT-A7)

Emitter-follower buffer amplifier. Changes in input impedance at different REC level control positions prevented. Buffering to next stage MPX filter.

Recording Dolby NR Section (Q402 and Q502 in CT-A9, and Q310 and Q410 in CT-A7)

HA12058NT-01 (Note) is used as the Dolby NR B/C IC, and operation is in conformity with PA3012.

Recording Amplifier

*** CT-A9 (Q112 and Q212)**

2-stage operational amplifier composition with separate recording equalizer amplifiers for each tape type.

*** CT-A7 (Q521)**

Operational amplifiers with separate recording equalizer amplifiers for each tape type.

Bias Oscillator Circuit (Q317 and Q318 in CT-A9, and Q512 and Q512 in CT-A7)

Two-transistor push-pull type where oscillator strength is changed by power supply voltage switching. Different bias currents for each tape type.

Automatic Switching of Tape Monitor Output

The function control microcomputer (PD4036) includes one KEY input and one control output (SOURCE) for switching the tape monitor output. The signal path is switched by electronic switch (TC4066BP). In addition to automatic switching to source monitor during recording standby mode and tape monitor during recording and playback modes, manual switching (cyclic) by KEY input is also possible. The PD4036 generates a line muting output signal 0.2ms to 0.5ms prior to switching of the monitor output switching control signal, and cancels the muting 20ms after the monitor output has been switched, thereby blocking the output of any switching noise.

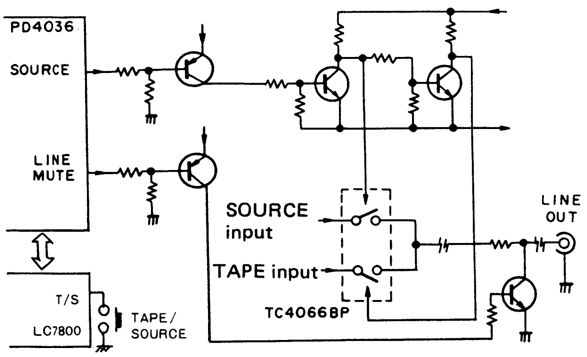

PD4036
SOURCE
LINE MUTE
SOURCE input
TAPE input
TC4066BP
LINE OUT
T/S
LC7800
TAPE/SOURCE

Fig. 4-2 Automatic tape monitor output switching circuit

Level Meter Circuit

*** CT-A9**

1. Line output signal is amplified by Q633.
2. Full-wave rectification (absolute value detection) is achieved by Q2004 and D2001 thru D2004.
3. The signal is compressed by a logarithmic compression circuit by using the transistor's non-linearity.
4. Signal offset is achieved in the offset circuit for level meter matching purposes.
5. Meter attack characteristics are determined by R2025 and C2006 (or R2111 and C2103) while the recovery characteristics are determined by C2006 and R2026 (or C2103 and R2112).
6. The signal compression characteristics are largely determined by the R2015 to R2016 (or R2103 to R2104) ratio. And since meter display is changed in 5dB steps below -15dB and in 1dB steps above -15dB, the compression characteristics are changed below -15dB by turning Q2002 (Q2102) on.
7. The 35-segment FL meter drive involves a 3-stage cascade connection of the 12-segment IC HA12010, and 0V, 3V, and 6V offset of pin 16 which determines the minimum indicated level. (11 segments are covered by Q2013 and Q2108).

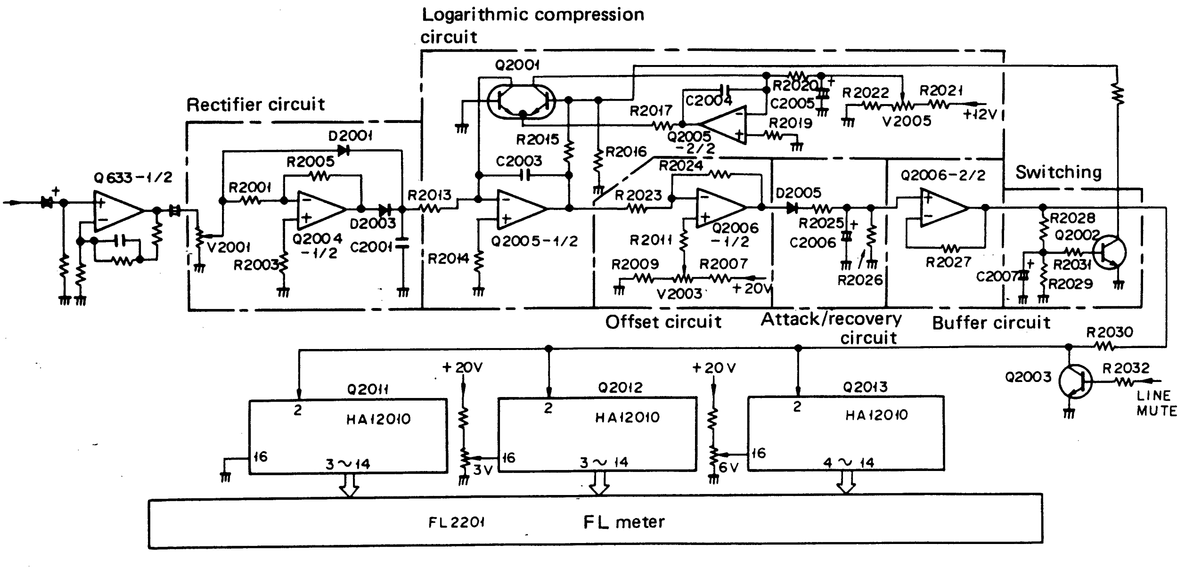

Logarithmic compression circuit
Rectifier circuit
Q633-1/2
R2001
R2005
D2001
D2003
Q2004 -1/2
C2001
V2001
R2003
R2013
R2014
Q2001
R2015
C2003
R2016
R2017
C2004
Q2005 -2/2
Q2005-1/2
R2020
C2005
R2019
R2022
R2021
V2005
+12V
R2024
R2023
Q2006 -1/2
R2011
R2009
R2007
V2003
+20V
D2005
R2025
C2006
R2026
Q2006-2/2
R2027
Switching
R2028
Q2002
R2031
C2007
R2029
Offset circuit
Attack/recovery circuit
Buffer circuit
R2030
Q2003
R2032
LINE MUTE
+20V
Q2011
HA12010
Q2012
HA12010
Q2013
HA12010
2
16
3～14
4～14
3V
6V
FL2201
FL meter

Fig. 4-3 Level meter circuit (CT-A9)

*** CT-A7**

1. Line output signal is amplified by Q517.
2. Full-wave rectification (absolute value detection) is achieved by Q518, D106, and D107, resulting in a negative DC voltage.
3. Meter attack characteristics are determined by R167 and C136 while the recovery characteristics are determined by R168 and C136. Q519 is a buffer amplifier.
4. Q520 is for phase inversion and signal offset to enable level matching of the meter.
5. The FL meter is driven by the level meter drive IC AN6870N. This IC is a two-channel dynamic type which incorporates an 18-point logarithmic scale generator comparator. A single basis to drive the left and right channels.

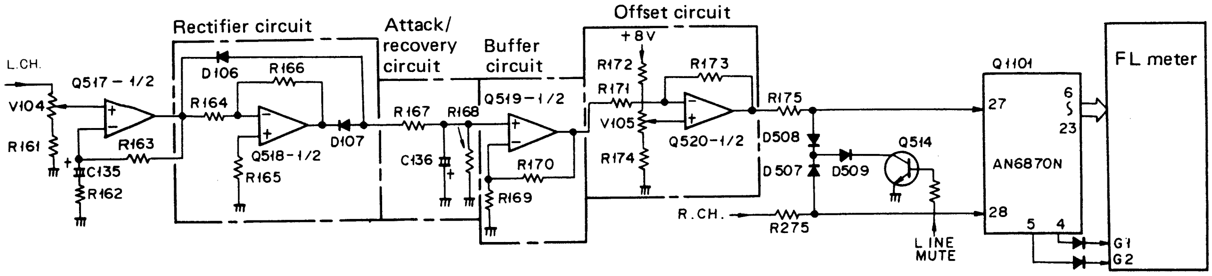

Rectifier circuit
Attack/ recovery circuit
Buffer circuit
Offset circuit
+8V
L.CH.
Q517-1/2
V104
R161
C135
R162
R163
D106
R166
R164
Q518-1/2
R165
D107
R167
R168
Q519-1/2
C136
R170
R169
R172
R171
R173
V105
R174
Q520-1/2
R175
D508
D507
D509
Q514
R.CH.
R275
LINE MUTE
Q1101
AN6870N
27
6
5
23
28
5
4
FL meter
G1
G2

Fig. 4-4 Level meter circuit (CT-A7)

4.2 CONTROL FUNCTION CIRCUITS

Reset Circuit

The reset output signal generated by the reset circuit shown in Fig. 4-5 is generated when the power is switched on and off. This signal is used to reset the function control IC (PD4036) and the tape counter (to 0000), and also to clear the BLE data (CT-A9).

An AC voltage (secondary coil of the power transformer) is applied across A and A' (see diagram), resulting in a +5V power supply with a more rapid trailing edge than the PD4036 power supply being connected to point E.

When the power is switched on, the potential at point C drops sharply (small R1·C1 time constant), resulting in D1 being cut off, and the potential at point D increasing at a slow rate (due to the R3·C2 time constant). Q1 remains on until the potential difference between points D and E is less than 0.6V, and the voltage generated in R4 by the Q1 collector current becomes the reset signal.

When the power is switched off, the potential at point D drops due to the R2·C1/C2 time constant, Q1 being turned on when the potential drops to more than 0.6V below the potential at point E, again resulting in the output of a reset signal from point F. Although the potentials at points E and F decrease because of the falling power supply, the decrease in the PD4036 power supply is relatively more gradual, thereby permitting the generation of the reset signal.

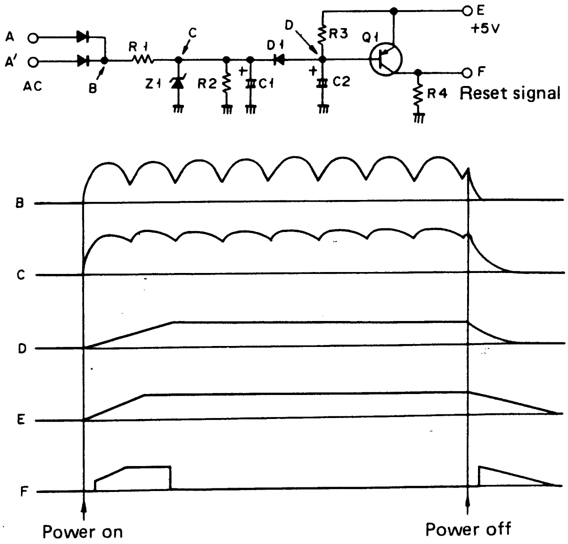

A
A'
AC
B
R1
C
Z1
R2
D
D1
C1
C2
R3
Q1
E
+5V
F
R4
Reset signal
B
C
D
E
F
Power on
Power off

Fig. 4-5 Reset circuit

Mechanical Mode Detector Section

In both the CT-A7 and CT-A9, mechanical operation modes are switched by a special motor (the assist motor) where precise control is achieved by a digital feedback servo control mechanism.

Changes in the degree of rotation of the cam gear which governs the tape transport mechanism modes are converted into 4-bit digital data by a rotary encoder (absolute encoder — see Fig. 4-6) mounted on the same axis as the cam. This data is then fed back to a control microcomputer.

Reel Motor Control Circuit

Rotational direction is determined by control signals applied to pins 5 and 6 of the motor drive control IC BA6109. And by reducing the voltage at pin 4 during playback mode, the take-up torque is decreased. Since the PD4036 is not equipped with pins for FF and rewind (cue and review) mode indication, these signals are obtained from the above reel motor control signals. And in the CT-A9, as the care-less reel motor is started sharply, the take-up torque is decreased by C1124 for a very short time.

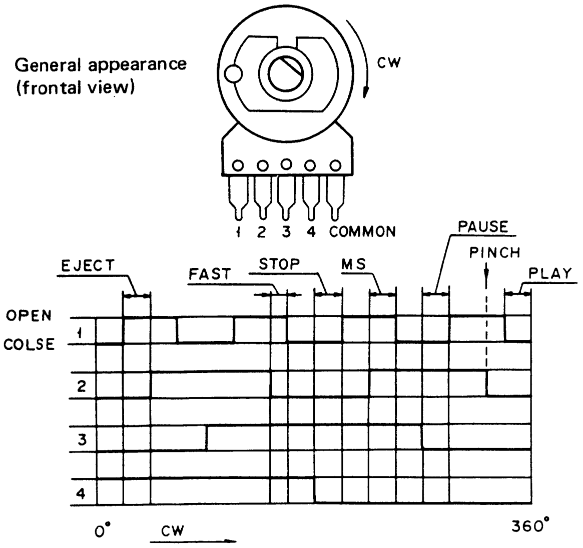

General appearance
(frontal view)
CW
1 2 3 4 COMMON
EJECT
FAST
STOP
MS
PAUSE
PINCH
PLAY
OPEN
COLSE
1
2
3
4
0°
CW
360°

Fig. 4-6 Rotary encoder

Assist Motor (Mechanical Mode Switching) Drive Circuit

Constant speed rotation (two switchable speeds) is obtained by bridge servo control employing the motor drive control IC BA6109. Normal mechanical mode changes are made at high speed (L level output at pin 15 of PD4036). And during eject operations, FF/rewind mode is executed at high speed, while the change to eject mode is made at low speed (H level output at pin 15). The tape loading operation is also executed at low speed.

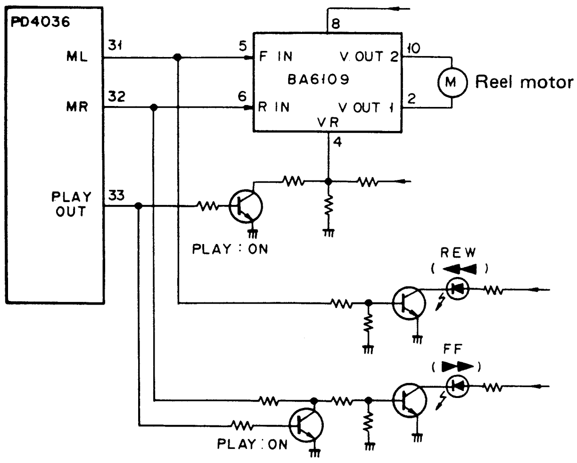

PD4036
ML
MR
PLAY
OUT
31
32
33
5
6
8
10
2
4
F IN
R IN
V OUT 2
V OUT 1
BA6109
VR
M
Reel motor
PLAY : ON
REW
FF
PLAY : ON

Fig. 4-7 Reel motor drive circuit

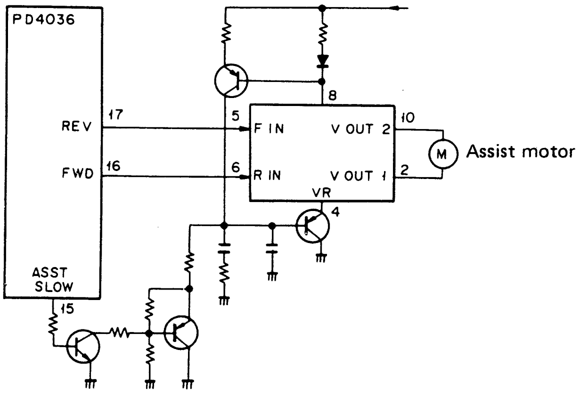

PD4036
REV
FWD
ASST
SLOW
17
16
15
5
6
8
10
2
4
F IN
R IN
V OUT 2
V OUT 1
VR
M
Assist motor

Fig. 4-8 Assist motor drive circuit

Tape Transport Detector Circuit

This detector circuit is used for tape end operations (auto stop) and ATLC operations (automatic tape slack control). Using a photo-interrupter in the detector section, rotation of three blades mounted on the reel base (right hand reel) interrupts the photo-coupling between an LED and phototransistor in an intermittent fashion. The electric signals obtained from this action are subsequently used to form pulse signals which are applied to pin 22 of PD4036. If input of these pulse signals is stopped for more than three seconds, tape transport mechanism is switched to stop mode.

And in the CT-A7, these pulse signals are counted and used to operate the tape counter. The CT-A9 is equipped with an additional two photo-interrupters (one on the left hand reel and one on the right) to operate the real-time tape counter.

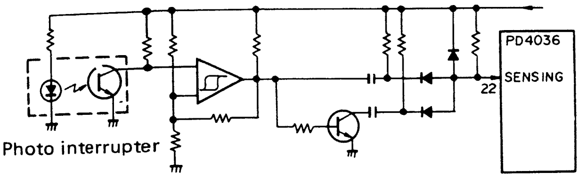


Fig. 4-9 Tape transport detector circuit

Cassette Half Detector

A photo-interrupter is mounted in the bottom right hand corner of the cassette compartment. When a cassette half is loaded, the photo-coupling between a phototransistor and LED is disconnected, thereby detecting the presence of the cassette half. If the cassette half is almost transparent, however, detecting its presence may not be possible.

Door Detector (Eject Detector)

A switch located on the left hand side of the mechanism is switched on by the cam action of the side cam gear when switching to eject mode, thereby detecting the change to eject mode. Since the input applied to PD4036 is generated from the key input matrix via LC7800, it is applied every 20ms.

Blank Portion Detector Circuit

The blank tape portion detector IC (BA335) is used in MS (music search) operations. A CUE or REVIEW playback signal is applied to pin 1 of BA335 where it is selected by comparator, resulting in Tr1 being turned on and capacitor C connected to pin 2 being charged up. Pin 6 is at H level at this time.

Tr1 is turned off when the input signal is stopped, resulting in capacitor C being discharged and pin 6 being switched to L level about 70ms later.

The MS FF and MS REW buttons activate the MS key input together with the FF key or REW key input, thereby enabling MS operations to be started by single push-button operations.

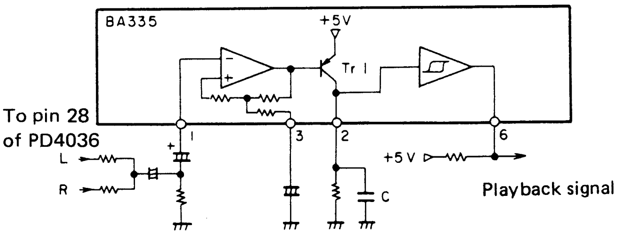


Fig. 4-10 Blank portion detector circuit

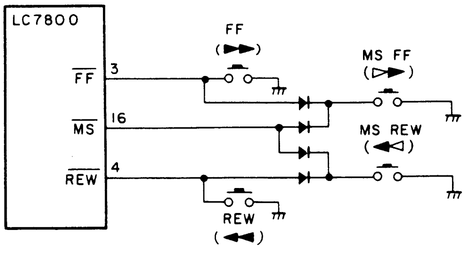


Fig. 4-11 MS key input circuit

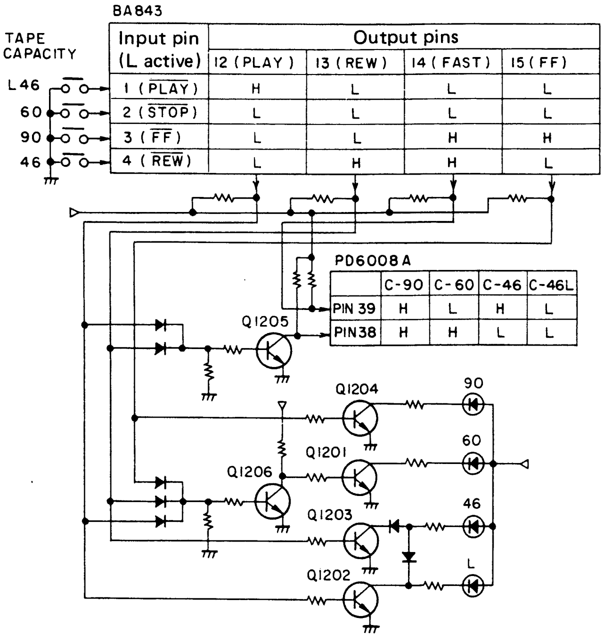
4.3 REAL-TIME TAPE COUNTER (CT-A9)

Employing the tape counter control IC PD6008A, the counter drive section of this circuit is much the same as in the CT-90R and CT-9R. The major differences lie in detection of tape transport mode by photo-interrupter, and the addition of logic and display circuits to handle TAPE CAPACITY switching by non-lock switch. (See Fig. 4-12).

The TAPE CAPACITY switching circuit includes a mechanical control IC (BA843 — used in standard class tape decks) where key input latching and PD6008A key input signals are generated. (See Fig. 4-13).

When the Power is Switched On

1. Q1214 is turned on by the reset signal.
2. PD6008A is reset when pin 3 is switched to L level, resulting in the display mode being switched to tape counter, and the display being cleared to "0000".


TAPE CAPACITY
L46
60
90
46
Q1205
Q1204
Q1206
Q1201
Q1203
Q1202
90
60
46
L

BA843

Input pin (L active)	Output pins			
	12 (PLAY)	13 (REW)	14 (FAST)	15 (FF)
1 ($\overline{\text{PLAY}}$)	H	L	L	L
2 ($\overline{\text{STOP}}$)	L	L	L	L
3 ($\overline{\text{FF}}$)	L	L	H	H
4 ($\overline{\text{REW}}$)	L	H	H	L

PD6008A

	C-90	C-60	C-46	C-46L
PIN 39	H	L	H	L
PIN38	H	H	L	L

Fig. 4-12 Real-time tape counter circuit

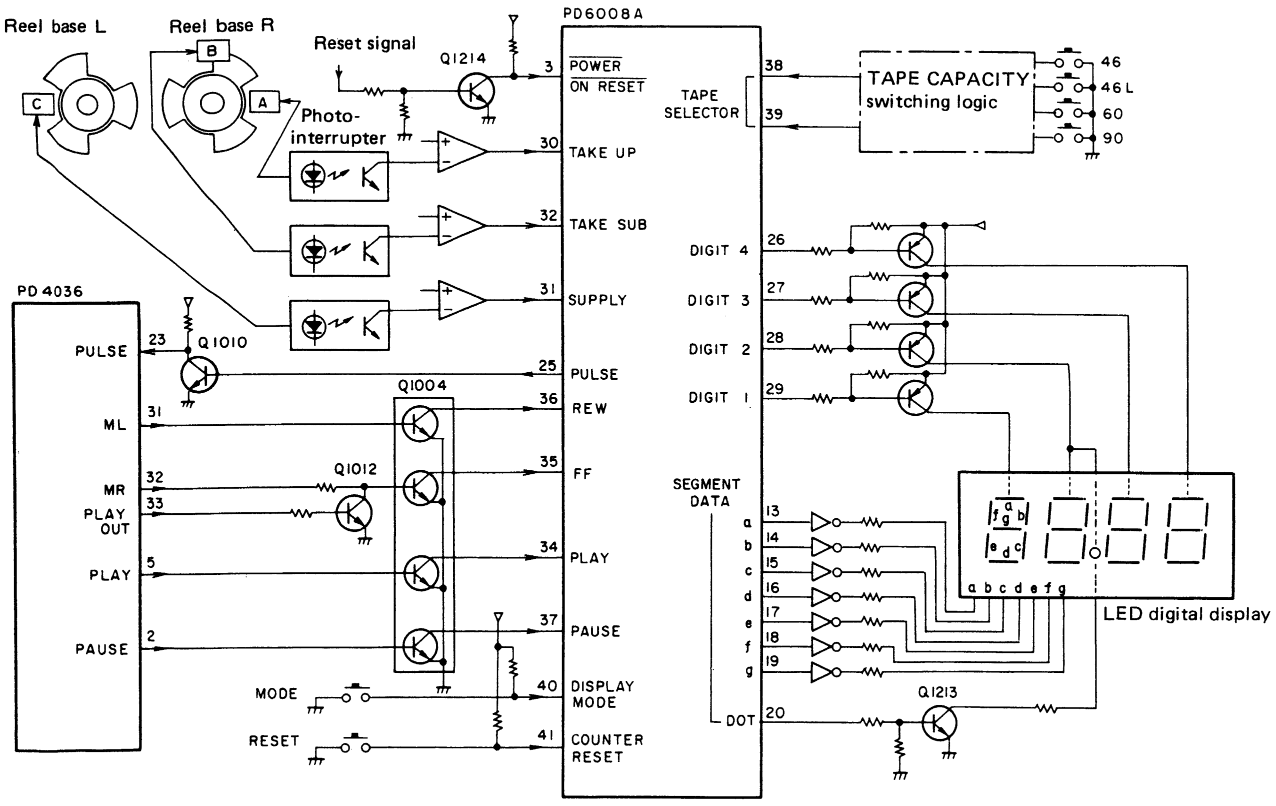

Reel base L
Reel base R
B
C
A
Reset signal
Q1214
Photo-interrupter
PD6008A
3
POWER ON RESET
30
TAKE UP
32
TAKE SUB
31
SUPPLY
25
PULSE
36
REW
35
FF
34
PLAY
37
PAUSE
40
DISPLAY MODE
41
COUNTER RESET
TAPE SELECTOR
38
39
TAPE CAPACITY switching logic
46
46L
60
90
DIGIT 4
DIGIT 3
DIGIT 2
DIGIT 1
26
27
28
29
SEGMENT DATA
a
b
c
d
e
f
g
DOT
13
14
15
16
17
18
19
20
a b c d e f g
LED digital display
Q1213
PD 4036
PULSE
ML
MR
PLAY OUT
PLAY
PAUSE
23
31
32
33
5
2
Q1010
Q1004
Q1012
MODE
RESET

Fig. 4-13 TAPE CAPACITY switching circuit

Operation as Normal Tape Counter

1. Photo-coupling is interrupted at regular intervals by photo-interrupter during tape transport (when the reel base is rotating), resulting in pulse signals being applied to pins 30 thru 32 of PD6008A.
2. The direction of tape transport is detected by the phase relationship between the input pulse signals applied to pins 30 and 32. The input pulses are consequently counted up or down, and the number shown in the LED display is changed accordingly.

Counter Display Resetting

When the RESET button is pressed, an "L" level input is applied to pin 41 of PD6008A, and the tape counter is cleared to "0000". If the display mode has been switched to real-time counter, the display is switched to "0000" while the RESET button remains depressed. But since real-time counter operations are continued in the PD6008A, the real-time counter display is resumed as soon as the RESET button is released.

Operation as Real-time Counter

When the TIME/TAPE button is pressed, an "L" input is applied to pin 40 of PD6008A, and the counter mode is changed to cyclic.

1. During real-time counter mode, pin 20 of PD6008A is at "H" level, Q1213 is on, and the dot indicator lights up.
2. Arithmetic operations are executed on the difference between cycle periods of the inputs applied to pins 30 and 31 of PD6008A (that is, changes in rpm occurring during tape travel), tape type data applied from pins 38 and 39, and mechanical operation mode data applied from pins 34 thru 37.
3. Since there is no display data during the first few seconds while this processing is taking place, pin 20 is changed to L and H levels aternately, resulting in Q1213 being switched on and off, and the dot indicator blinking on and off. Upon completion of the arithmetic operations, the remaining tape time is displayed, pin 20 is fixed to H level, and dot indicator remains on.
4. The above arithmetic operations are executed constantly during tape transport, resulting in constant correcting of the remaining time display. This display is changed in 1 second steps during normal transport modes (recording and playback), and in 10 second steps during fast transport modes (FF and rewind).
5. If tape transport is switched to stop or pause mode, the display value which has just been reached is held.

4.4 AUTO-BLE (CT-A9)

The Automatic Bias Level Equalizer Tuning System (AUTO-BLE) featured in the CT-A9 automatically adjusts the recording bias current,

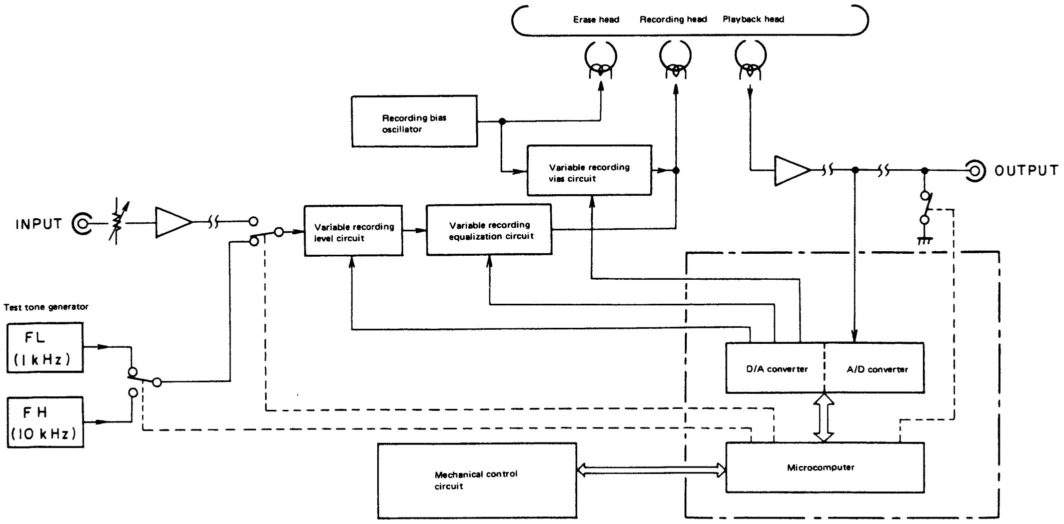

Erase head
Recording head
Playback head
Recording bias oscillator
Variable recording vias circuit
OUTPUT
INPUT
Variable recording level circuit
Variable recording equalization circuit
Test tone generator
FL (1 kHz)
FH (10 kHz)
D/A converter
A/D converter
Mechanical control circuit
Microcomputer

Fig. 4-14 AUTO-BLE block diagram

the recording level, and the recording equalization to obtain optimum recording conditions for the cassette tape to be used. This function is also capable of offsetting the bias adjustment point by about ±1.5dB in respect to the source signal. The three separate conditions which can be achieved are referred to as UNDER BIAS BLE, PEAK BIAS BLE, and OVER BIAS BLE respectively.

The recording equalization and level in these conditions are adjusted so as to obtain a flat frequency response and the specified recording level at the specified bias point.

The circuit consists of PD4037 (4-bit microcomputer) and PM9001A (AUTO-BLE IC) where various control operations and decision required for automatic adjustment are executed in addition to storage of data. (See Fig. 4-14). The A/D circuit is used during adjustment operations to convert playback signal levels into digital signals capable of being processed by the microcomputer. The variable recording bias current circuit can vary the bias current in 16 steps by using a programmable attenuator in the bias oscillator output circuit. And with an additional attenuator circuit, UNDER, PEAK, and OVER BIAS settings can be made. The variable recording level circuit can vary the recording level in 16 steps by using a programmable attenuator in the pre-stage of the recording amplifier. The variable recording equalization circuit exchanges the programmable attenuator resistor for a capacitor to change the LC resonance frequency in the recording amplifier feedback circuit, thereby achieving 64-step equalization characteristics. (Although the PM9001A is based on 4-bits internally, 2 additional bits are obtained from PD4037 to enable 6-bit control).

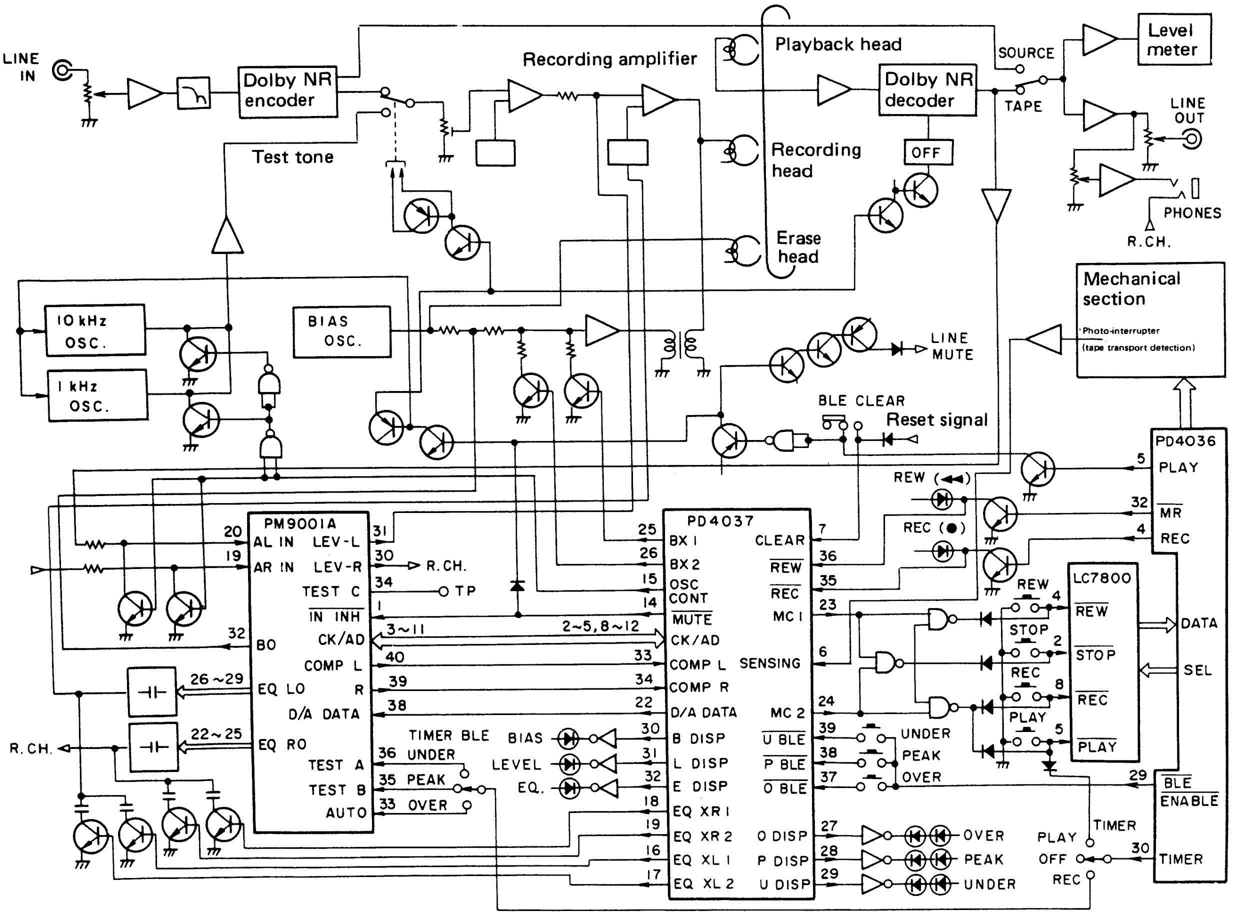
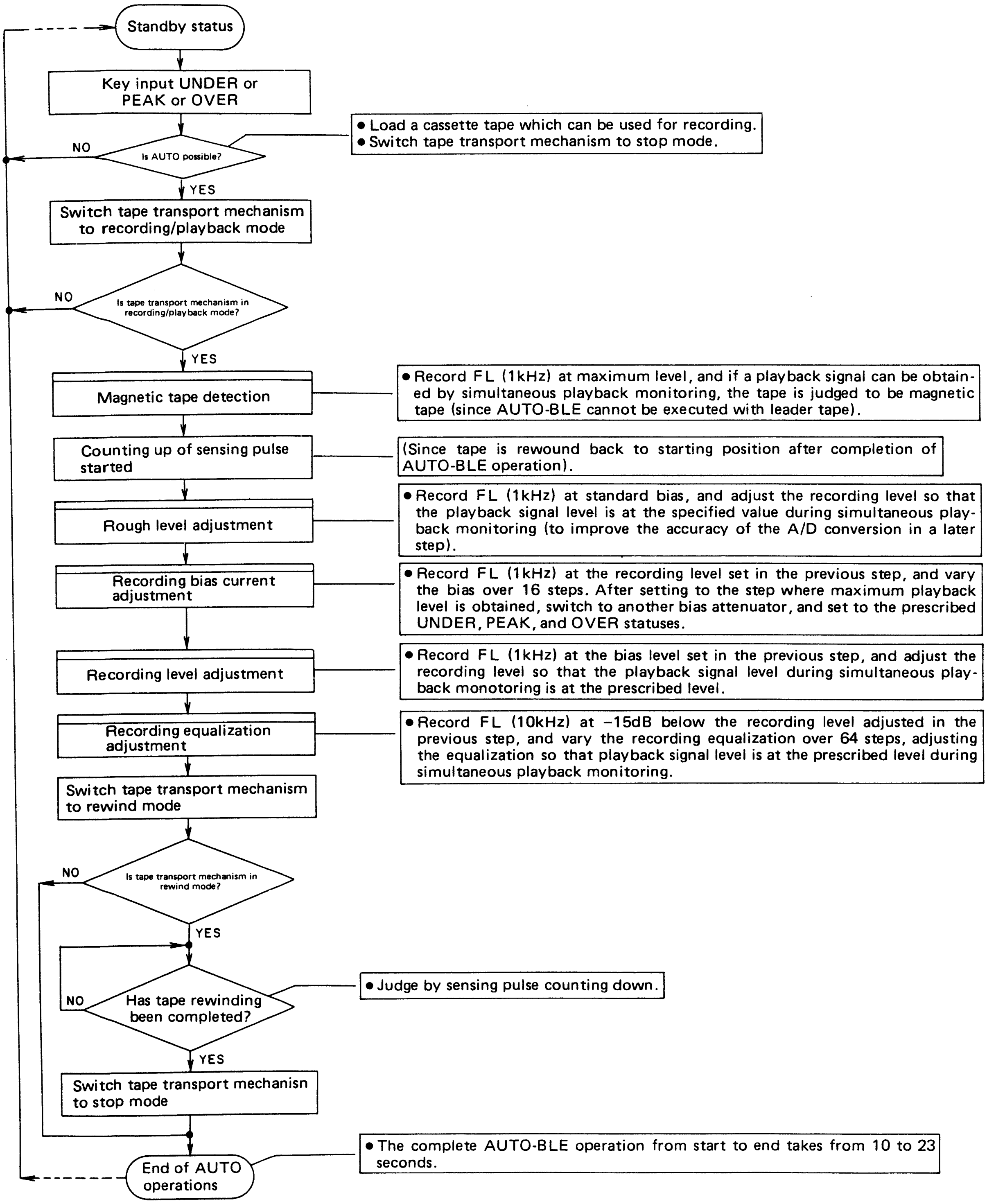

LINE IN
Dolby NR encoder
Recording amplifier
Playback head
SOURCE
TAPE
Level meter
Dolby NR decoder
LINE OUT
Test tone
Recording head
OFF
PHONES
R.CH.
Erase head
Mechanical section
Photo-interrupter (tape transport detection)
10 kHz OSC.
1 kHz OSC.
BIAS OSC.
LINE MUTE
BLE CLEAR
Reset signal
PD4036
PLAY
MR
REC
REW (◀◀)
REC (●)
PM9001A
AL IN
AR IN
LEV-L
LEV-R
TEST C
IN INH
CK/AD
COMP L
R
D/A DATA
BO
EQ LO
EQ RO
TEST A
TEST B
AUTO
R.CH.
TP
TIMER BLE
36 UNDER
35 PEAK
33 OVER
BIAS
LEVEL
EQ.
2~5,8~12
3~11
26~29
22~25
PD4037
BX 1
BX 2
OSC CONT
MUTE
CK/AD
COMP L
COMP R
D/A DATA
B DISP
L DISP
E DISP
EQ XR 1
EQ XR 2
EQ XL 1
EQ XL 2
CLEAR
REW
REC
MC 1
SENSING
MC 2
U BLE
P BLE
O BLE
O DISP
P DISP
U DISP
UNDER
PEAK
OVER
LC7800
REW
STOP
REC
PLAY
DATA
SEL
BLE ENABLE
TIMER
PLAY
OFF
REC
TIMER

Fig. 4-15 AUTO-BLE circuit

AUTO-BLE Operation


Standby status
Key input UNDER or PEAK or OVER
NO
Is AUTO possible?
YES
Switch tape transport mechanism to recording/playback mode
NO
Is tape transport mechanism in recording/playback mode?
YES
Magnetic tape detection
Counting up of sensing pulse started
Rough level adjustment
Recording bias current adjustment
Recording level adjustment
Recording equalization adjustment
Switch tape transport mechanism to rewind mode
NO
Is tape transport mechanism in rewind mode?
YES
NO
Has tape rewinding been completed?
YES
Switch tape transport mechanisn to stop mode
End of AUTO operations

- Load a cassette tape which can be used for recording.
- Switch tape transport mechanism to stop mode.

- Record FL (1kHz) at maximum level, and if a playback signal can be obtained by simultaneous playback monitoring, the tape is judged to be magnetic tape (since AUTO-BLE cannot be executed with leader tape).

(Since tape is rewound back to starting position after completion of AUTO-BLE operation).

- Record FL (1kHz) at standard bias, and adjust the recording level so that the playback signal level is at the specified value during simultaneous playback monitoring (to improve the accuracy of the A/D conversion in a later step).

- Record FL (1kHz) at the recording level set in the previous step, and vary the bias over 16 steps. After setting to the step where maximum playback level is obtained, switch to another bias attenuator, and set to the prescribed UNDER, PEAK, and OVER statuses.

- Record FL (1kHz) at the bias level set in the previous step, and adjust the recording level so that the playback signal level during simultaneous playback monotoring is at the prescribed level.

- Record FL (10kHz) at −15dB below the recording level adjusted in the previous step, and vary the recording equalization over 64 steps, adjusting the equalization so that playback signal level is at the prescribed level during simultaneous playback monitoring.

- Judge by sensing pulse counting down.

- The complete AUTO-BLE operation from start to end takes from 10 to 23 seconds.

Fig. 4-16 AUTO-BLE operation flowchart

4.5 CAPSTAN MOTOR CIRCUIT (CT-A9)

Speed Detector

When the DD (direct drive) motor is running at a constant rpm, a 726Hz output signal is obtained from an FG coil incorporated in that motor. This signal is passed to PA2011 where it is amplified in an FG amplifier stage before being passed to an F-V converter. Then following waveform rectification by a Schmidt trigger, the frequency is converted into a voltage by the Ct, Co, and Rt time constant circuit.

Reference Phase Generator

A 7.4283MHz signal generated by a crystal resonator in PD1007 is divided by 5120 to obtain a 1450.8Hz output. Then after the frequency of this signal is halved in PA2011, the signal phase is converted into a voltage by a P-V converter, and the voltage signal is passed to an F-V converter via Rp.

Rotational Control

The voltage obtained from the F-V and P-V converters are converted by sample hold circuit into a DC voltage which is passed via a buffer amplifier to PA2012. This voltage is compared by a differential amplifier in PA2012 with a reference voltage output from pin 12 of PD2011, the resultant differential voltage being used to determine the current passed through the motor coil. If the motor speed is slow, the input voltage is lower than the reference voltage, and a current corresponding to the differential voltage is passed. And if the motor speed is fast, the input voltage is higher than the reference voltage, resulting in the current being cut off.

Drive Circuit

Hall elements Ha and Hb are mounted in a way that produces a 90° phase difference in the respective output voltages. Voltage waveform signals (see Fig. 4-17) generated by a position signal synthesizer circuit are passed to the drive circuit. The respective switching of LA, Ls, and LCOM, and the subsequent motor drive operations are dependent on these signals. The coil current at this time is proportional to the PA2012 differential amplifier input potential difference.

Although a large torque is required when starting the motor, the torque required when running at a constant speed is not so large. For this reason, whereas the waveform of the current passed through the Hall elements when starting up is as shown by the full lines in Fig. 4-17, the waveform is smoothed out as shown by the dotted lines once constant speed is reached. This results in further reduction of motor vibration.

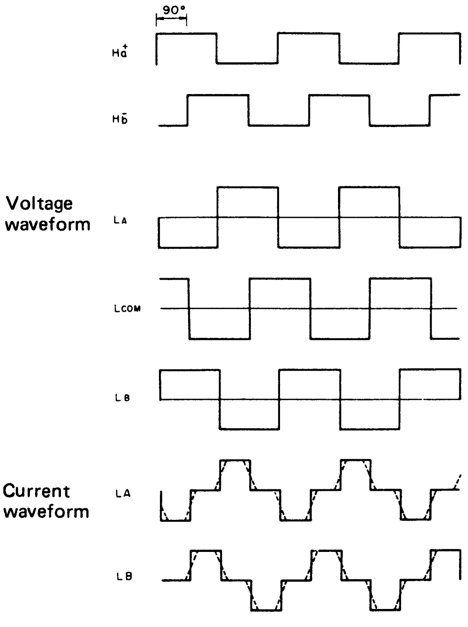


Fig. 4-17 Motor drive circuit waveforms

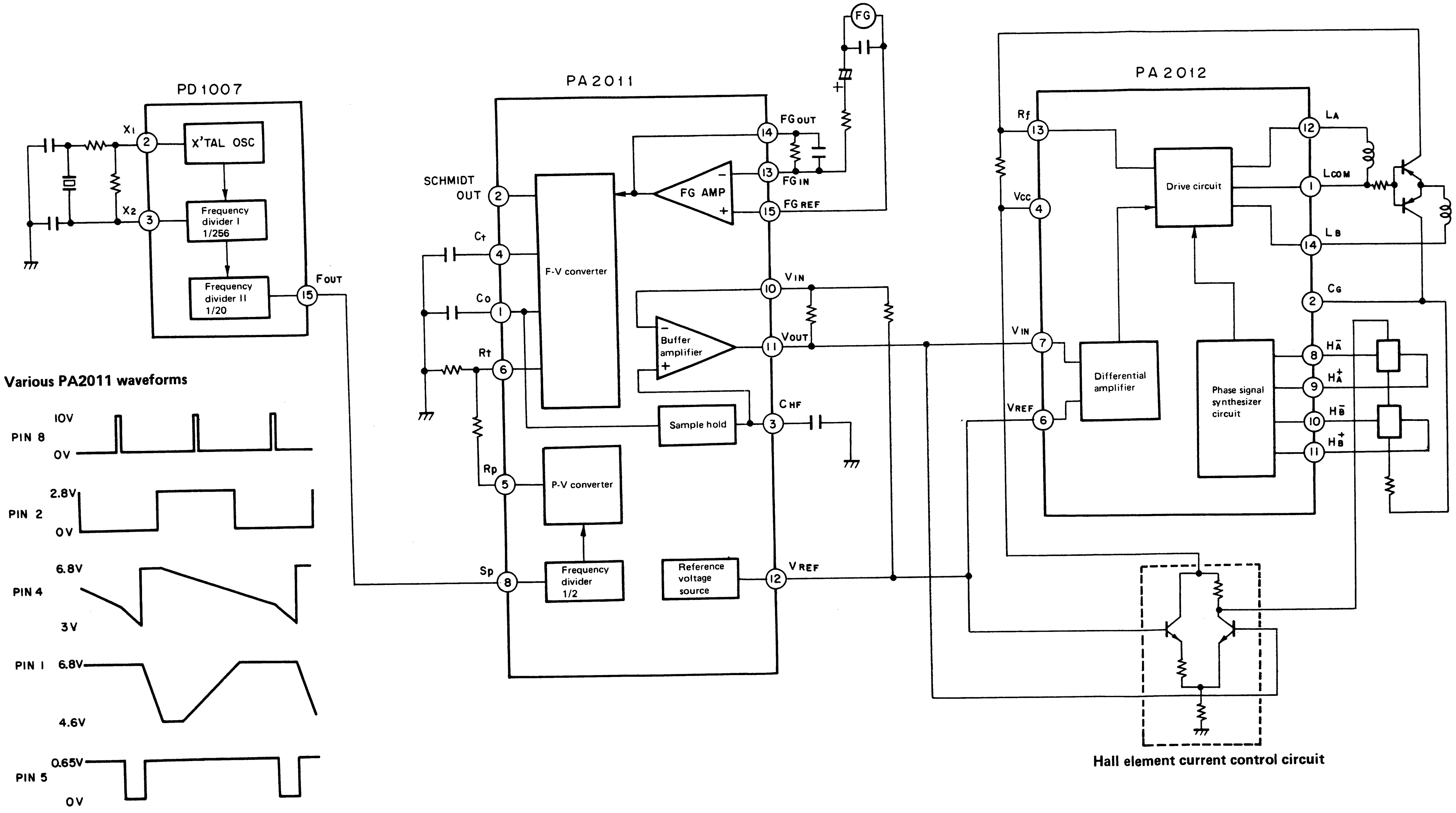

PD1007
X1
X2
2
3
X'TAL OSC
Frequency divider I 1/256
Frequency divider II 1/20
FOUT
15
PA2011
SCHMIDT OUT
2
Ct
4
Co
1
Rt
6
Rp
5
Sp
8
F-V converter
FG AMP
Buffer amplifier
Sample hold
P-V converter
Frequency divider 1/2
Reference voltage source
14
FG OUT
13
FG IN
15
FG REF
FG
10
VIN
11
VOUT
3
CHF
12
VREF
PA2012
Rf
13
Vcc
4
VIN
7
VREF
6
Drive circuit
Differential amplifier
Phase signal synthesizer circuit
12
LA
1
LCOM
14
LB
2
CG
8
HĀ
9
HA+
10
HB̄
11
HB+
Hall element current control circuit
Various PA2011 waveforms
PIN 8
10V
0V
PIN 2
2.8V
0V
PIN 4
6.8V
3V
PIN 1
6.8V
4.6V
PIN 5
0.65V
0V

Fig. 4-18 Capstan motor circuit (CT-A9)

4.6 OUTLINE OF CONTROL SYSTEM OPERATIONS

When Power is Switched On

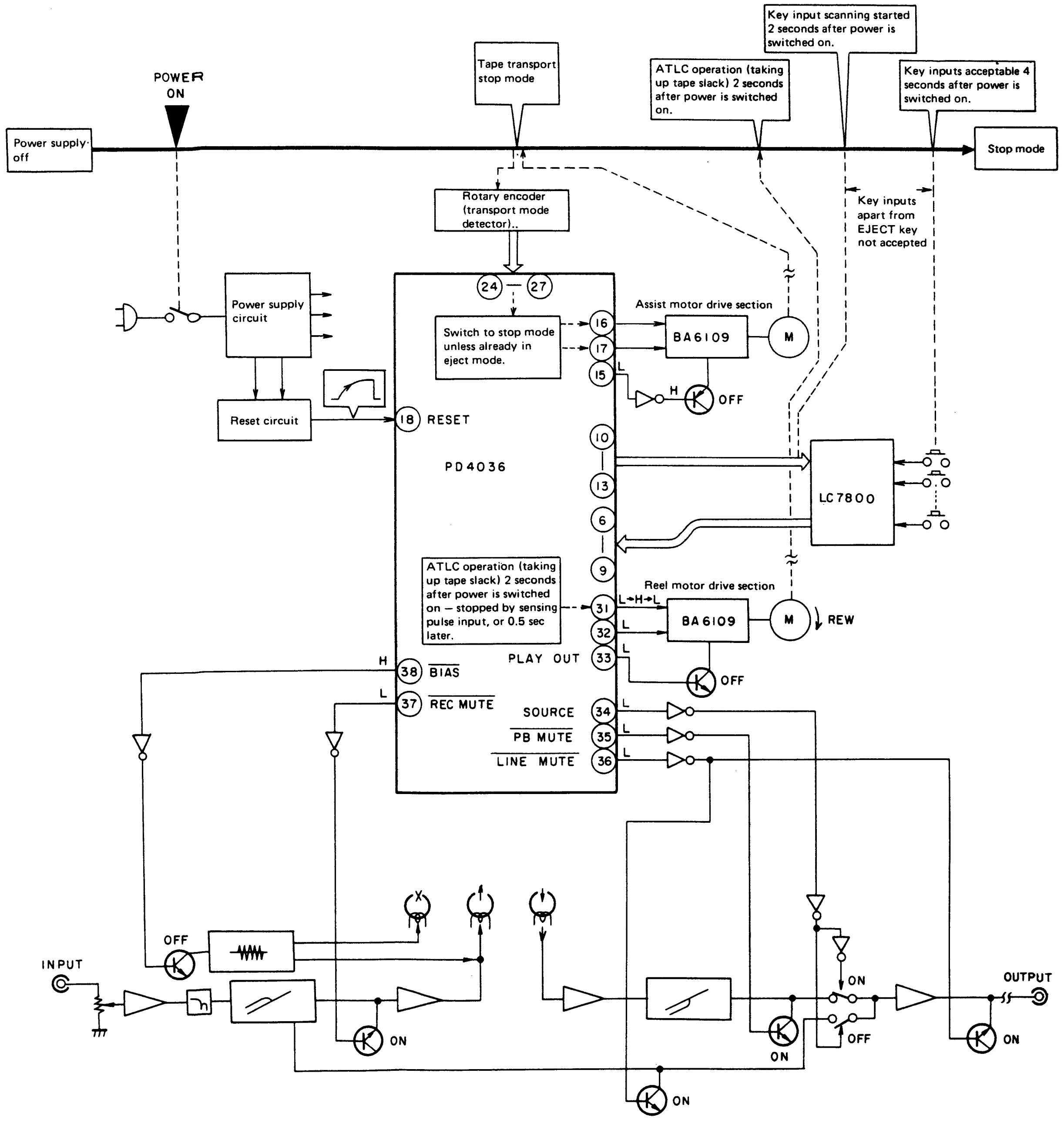

Key input scanning started 2 seconds after power is switched on.
Tape transport stop mode
ATLC operation (taking up tape slack) 2 seconds after power is switched on.
Key inputs acceptable 4 seconds after power is switched on.
POWER ON
Power supply off
Stop mode
Rotary encoder (transport mode detector).
Key inputs apart from EJECT key not accepted
24
27
Power supply circuit
Switch to stop mode unless already in eject mode.
Assist motor drive section
16
17
15
BA6109
M
H
OFF
Reset circuit
18
RESET
10
13
6
9
PD4036
LC7800
ATLC operation (taking up tape slack) 2 seconds after power is switched on – stopped by sensing pulse input, or 0.5 sec later.
Reel motor drive section
L→H→L
31
32
33
L
BA6109
M
REW
OFF
PLAY OUT
H
38
BIAS
L
37
REC MUTE
SOURCE
34
PB MUTE
35
LINE MUTE
36
INPUT
OFF
ON
ON
OFF
ON
OUTPUT
ON
ON

Fig. 4-19 When power supply is switched on

When Cassette Tape is Loaded

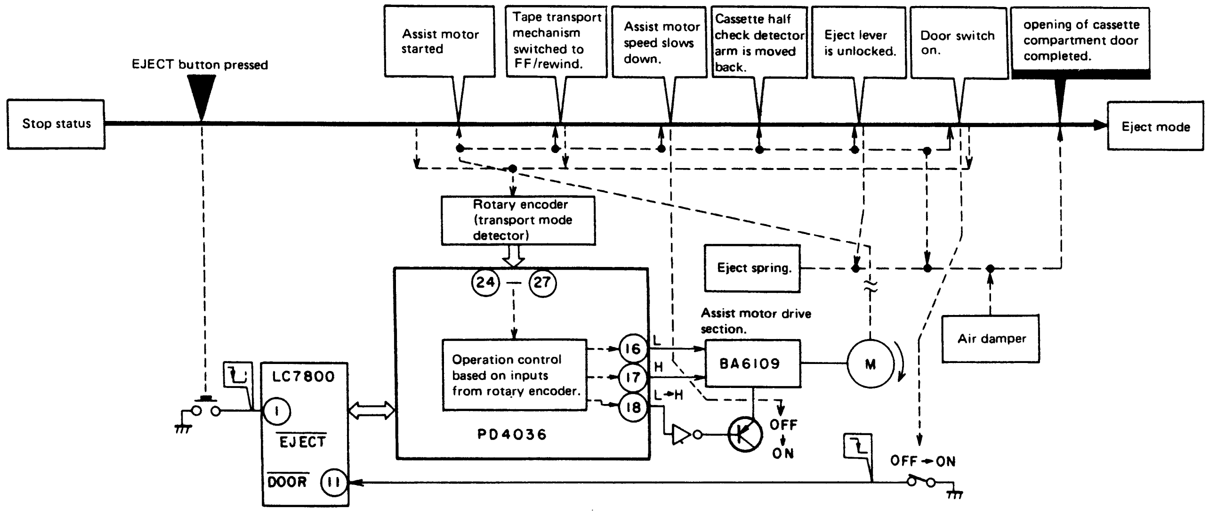

EJECT button pressed
Stop status
Assist motor started
Tape transport mechanism switched to FF/rewind.
Assist motor speed slows down.
Cassette half check detector arm is moved back.
Eject lever is unlocked.
Door switch on.
opening of cassette compartment door completed.
Eject mode
Rotary encoder (transport mode detector)
Eject spring.
Air damper
24
27
Assist motor drive section.
Operation control based on inputs from rotary encoder.
16
17
18
L
H
L→H
BA6109
M
OFF
ON
OFF→ON
LC7800
1
EJECT
DOOR
11
PD4036

Fig. 4-20 Powered eject operation

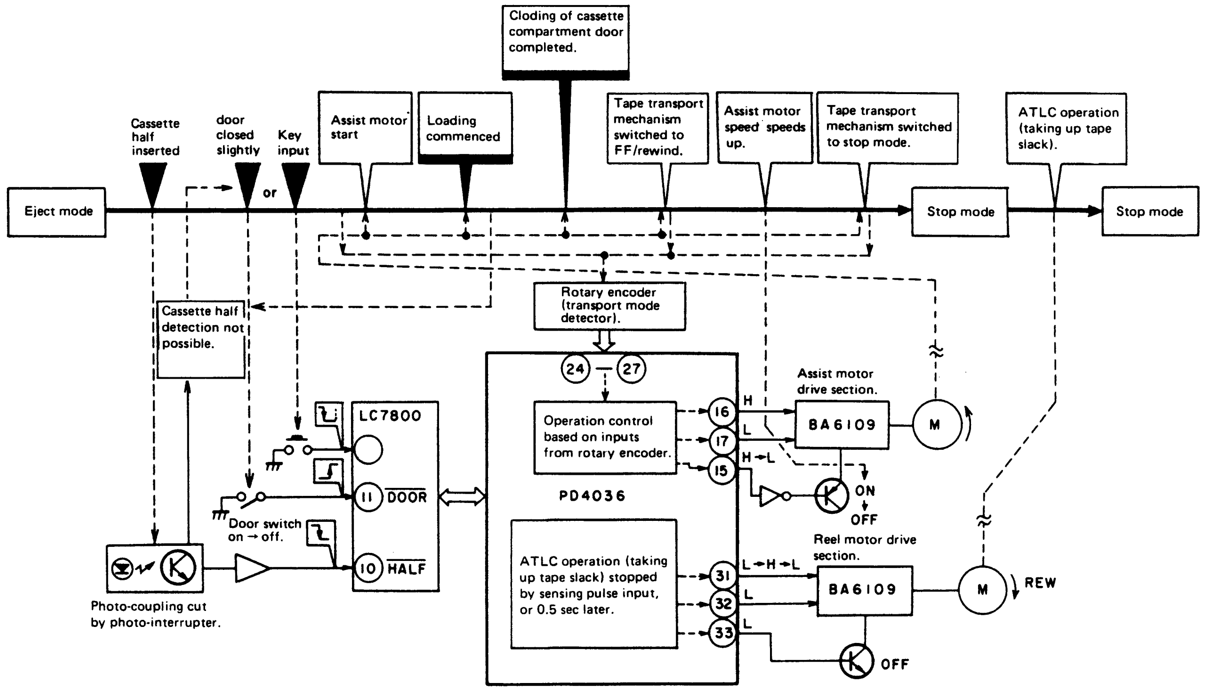

Cloding of cassette compartment door completed.
Cassette half inserted
door closed slightly
Key input
or
Assist motor start
Loading commenced
Tape transport mechanism switched to FF/rewind.
Assist motor speed speeds up.
Tape transport mechanism switched to stop mode.
ATLC operation (taking up tape slack).
Eject mode
Stop mode
Stop mode
Cassette half detection not possible.
Rotary encoder (transport mode detector).
24
27
Assist motor drive section.
Operation control based on inputs from rotary encoder.
16
17
15
H
L
H→L
BA6109
M
ON
OFF
LC7800
11
DOOR
10
HALF
Door switch on→off.
PD4036
ATLC operation (taking up tape slack) stopped by sensing pulse input, or 0.5 sec later.
31
32
33
L→H→L
Reel motor drive section.
BA6109
M
REW
OFF
Photo-coupling cut by photo-interrupter.

Fig. 4-21 Tape loading operation

Playback Mode

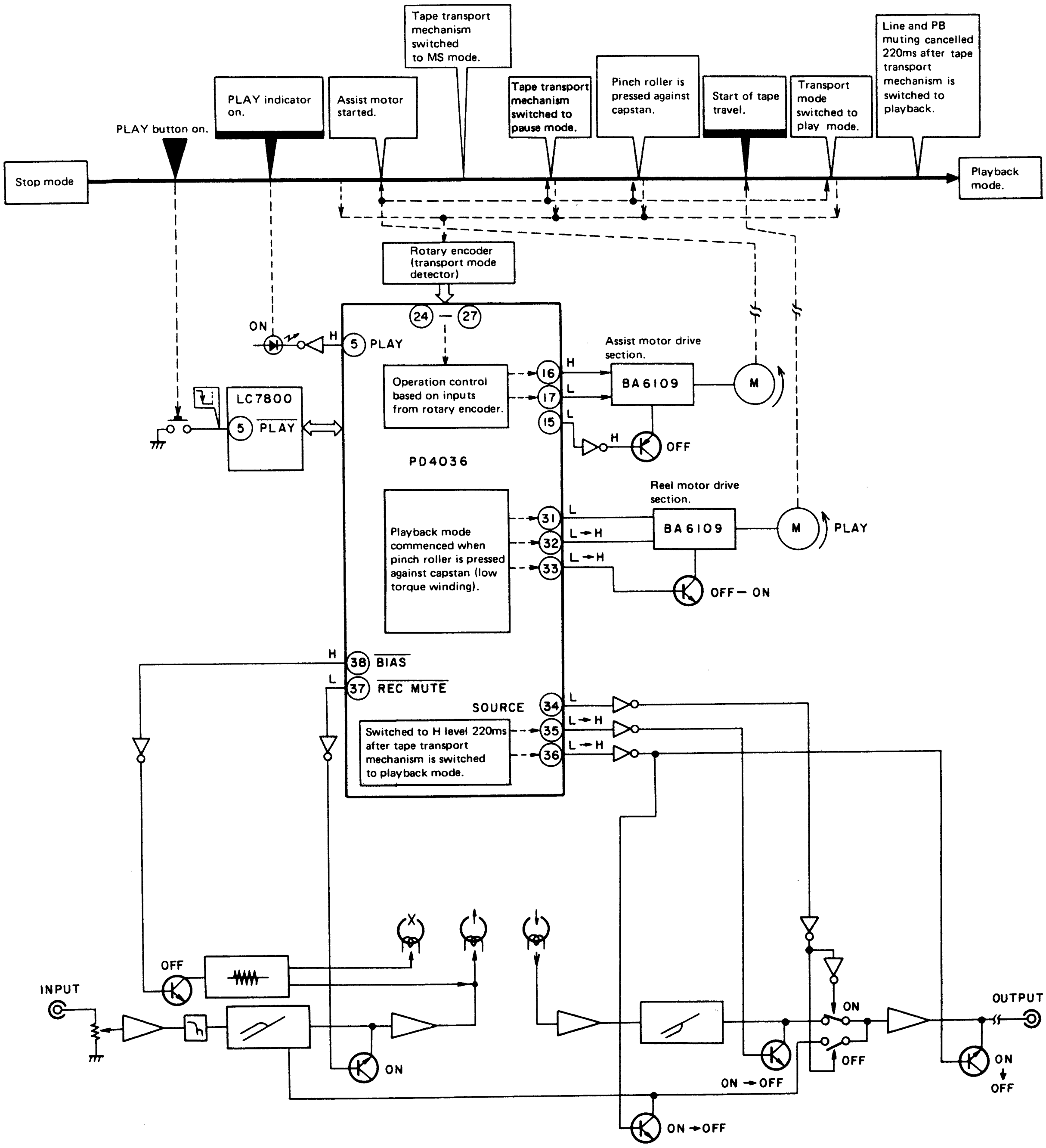

Tape transport mechanism switched to MS mode.
Line and PB muting cancelled 220ms after tape transport mechanism is switched to playback.
PLAY indicator on.
Assist motor started.
Tape transport mechanism switched to pause mode.
Pinch roller is pressed against capstan.
Start of tape travel.
Transport mode switched to play mode.
PLAY button on.
Stop mode
Playback mode.
Rotary encoder (transport mode detector)
24
27
ON
H
5 PLAY
Operation control based on inputs from rotary encoder.
16
17
15
H
L
L
H
OFF
Assist motor drive section.
BA6109
M
LC7800
5 PLAY
PD4036
Reel motor drive section.
Playback mode commenced when pinch roller is pressed against capstan (low torque winding).
31
32
33
L
L→H
L→H
BA6109
M
PLAY
OFF— ON
H
38 BIAS
L
37 REC MUTE
SOURCE
34
35
36
L
L→H
L→H
Switched to H level 220ms after tape transport mechanism is switched to playback mode.
INPUT
OFF
ON
ON
OFF
ON →OFF
OUTPUT
ON
OFF
ON →OFF

Fig. 4-22 From stop to playback mode

Recording Mode

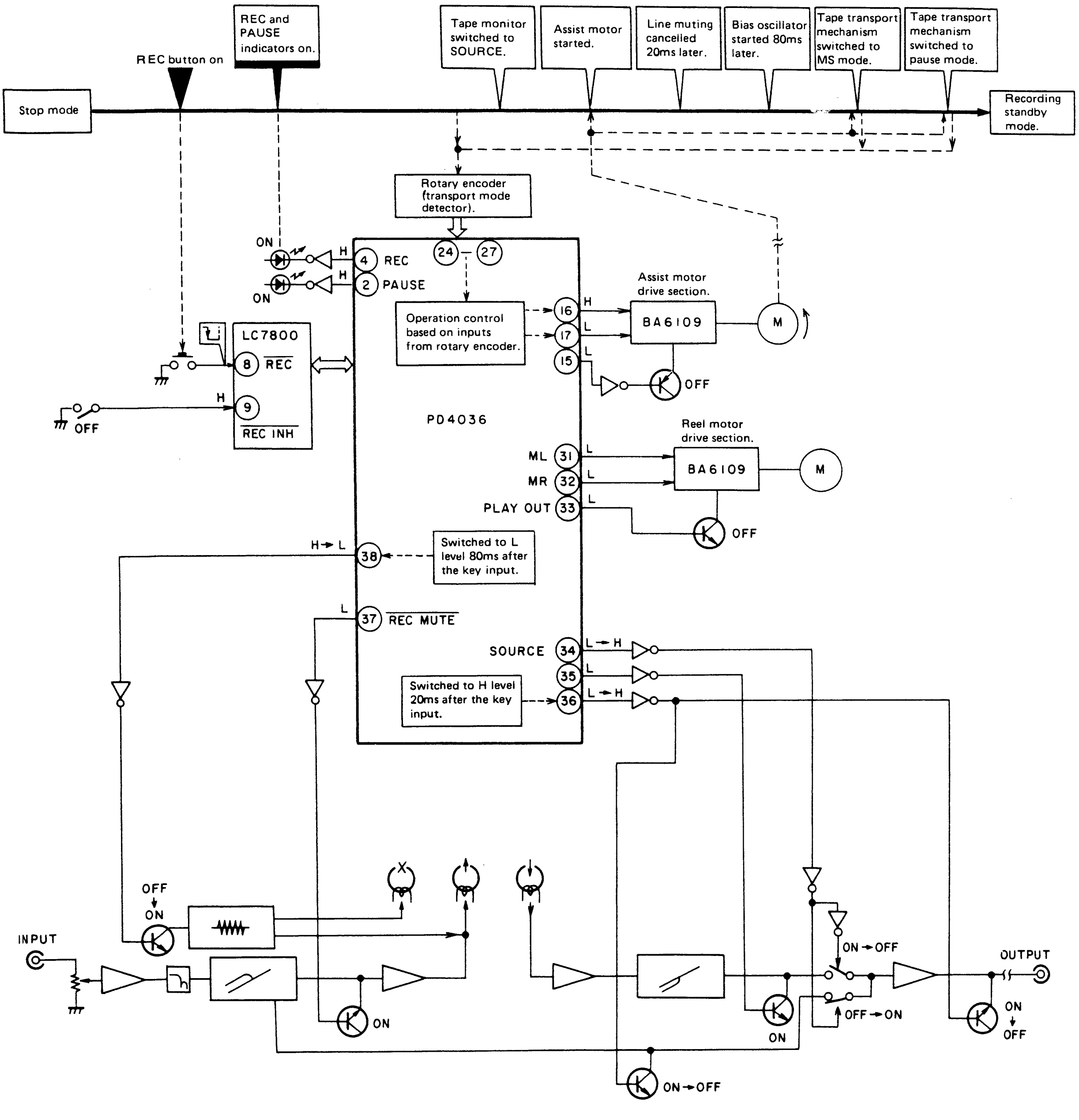

Stop mode
REC button on
REC and PAUSE indicators on.
Tape monitor switched to SOURCE.
Assist motor started.
Line muting cancelled 20ms later.
Bias oscillator started 80ms later.
Tape transport mechanism switched to MS mode.
Tape transport mechanism switched to pause mode.
Recording standby mode.
Rotary encoder (transport mode detector).
ON
ON
H
H
4 REC
2 PAUSE
24 – 27
Operation control based on inputs from rotary encoder.
16 H
17 L
15 L
Assist motor drive section.
BA6109
M
OFF
LC7800
8 REC
H
9
REC INH
OFF
PD4036
Reel motor drive section.
ML 31 L
MR 32 L
PLAY OUT 33 L
BA6109
M
OFF
H→L
38
Switched to L level 80ms after the key input.
L
37 REC MUTE
SOURCE 34 L→H
35 L
36 L→H
Switched to H level 20ms after the key input.
OFF
↓
ON
INPUT
ON
ON
ON→OFF
OFF→ON
ON
OUTPUT
ON
↓
OFF
ON→OFF

Fig. 4-23 From stop to recording-pause mode

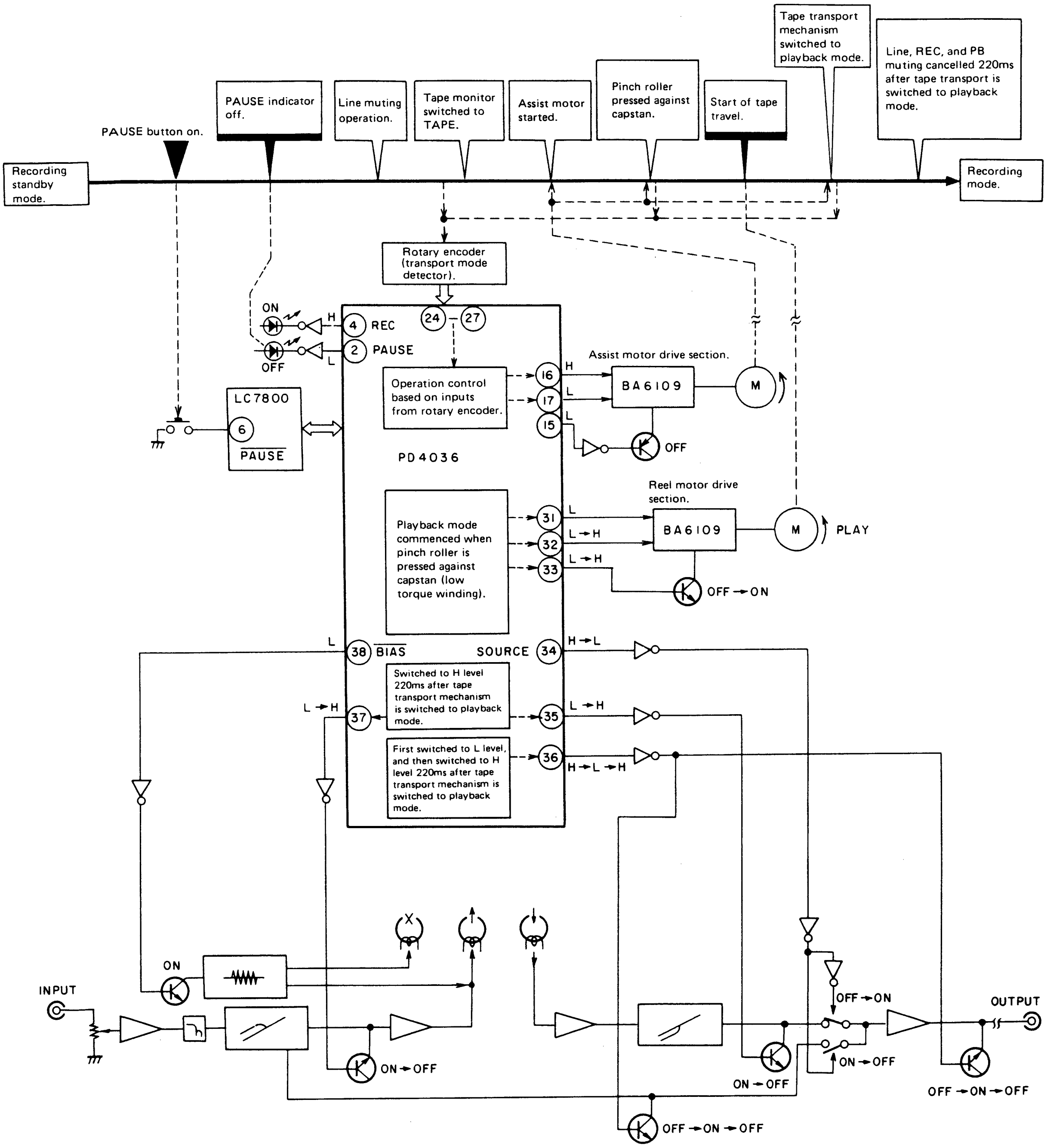

Recording standby mode.
PAUSE button on.
PAUSE indicator off.
Line muting operation.
Tape monitor switched to TAPE.
Assist motor started.
Pinch roller pressed against capstan.
Start of tape travel.
Tape transport mechanism switched to playback mode.
Line, REC, and PB muting cancelled 220ms after tape transport is switched to playback mode.
Recording mode.
Rotary encoder (transport mode detector).
ON
OFF
H
L
4
REC
2
PAUSE
24
27
LC7800
6
PAUSE
Operation control based on inputs from rotary encoder.
16
17
15
PD4036
Assist motor drive section.
BA6109
M
OFF
Reel motor drive section.
Playback mode commenced when pinch roller is pressed against capstan (low torque winding).
31
32
33
L→H
BA6109
M
PLAY
OFF→ON
38
BIAS
SOURCE
34
H→L
Switched to H level 220ms after tape transport mechanism is switched to playback mode.
L→H
37
35
First switched to L level, and then switched to H level 220ms after tape transport mechanism is switched to playback mode.
36
H→L→H
INPUT
ON
ON→OFF
OFF→ON
ON→OFF
ON→OFF
OUTPUT
OFF→ON→OFF
OFF→ON→OFF

Fig. 4-24 From recording-pause to recording mode

REC MUTE Operation

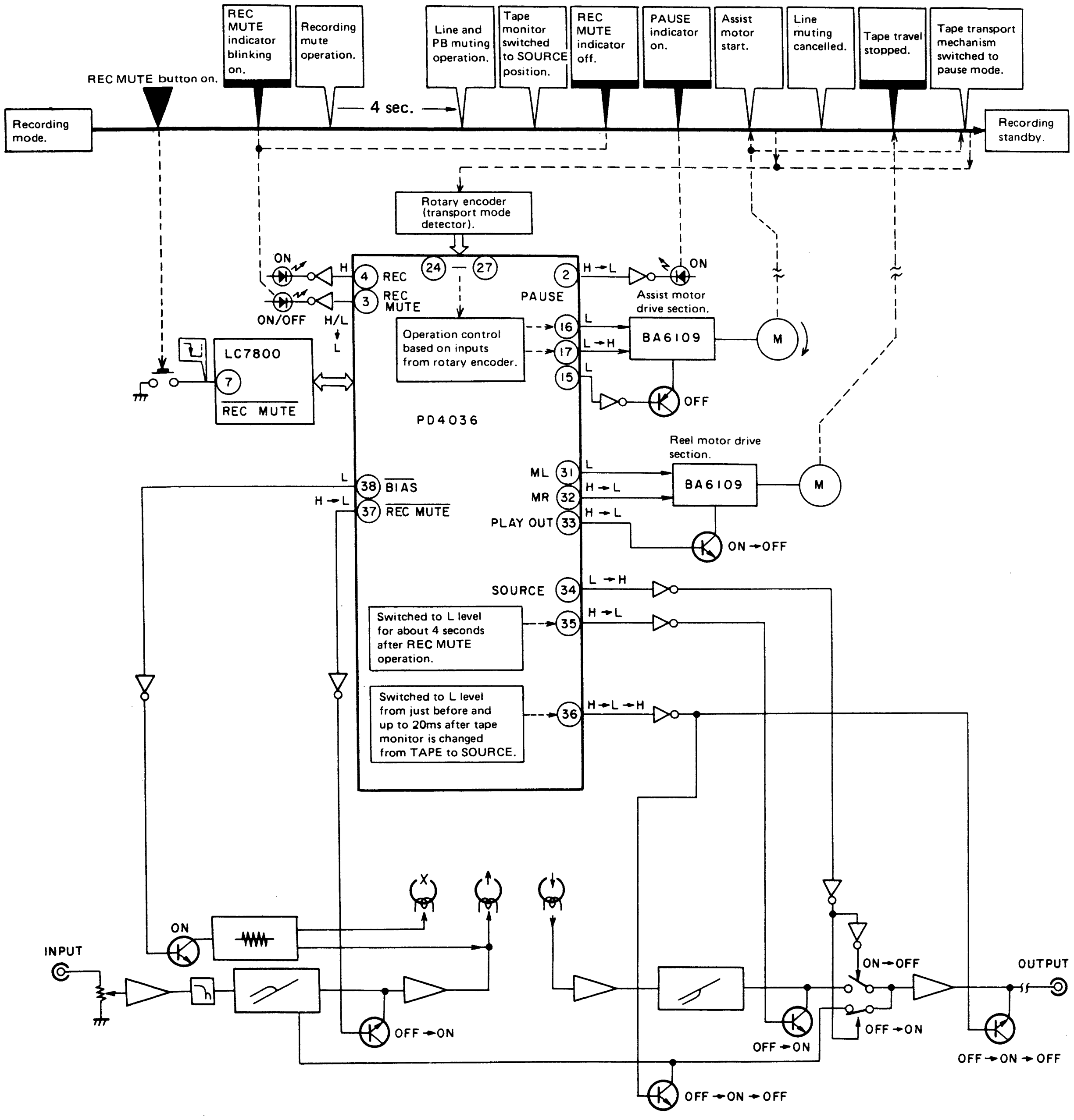

REC MUTE indicator blinking on.
Recording mute operation.
Line and PB muting operation.
Tape monitor switched to SOURCE position.
REC MUTE indicator off.
PAUSE indicator on.
Assist motor start.
Line muting cancelled.
Tape travel stopped.
Tape transport mechanism switched to pause mode.
REC MUTE button on.
4 sec.
Recording mode.
Recording standby.
Rotary encoder (transport mode detector).
ON
ON/OFF
H
H/L
L
4 REC
3 REC MUTE
24 — 27
2 PAUSE
H → L
ON
Assist motor drive section.
Operation control based on inputs from rotary encoder.
16
17
15
L
L → H
BA6109
M
OFF
LC7800
7
REC MUTE
PD4036
Reel motor drive section.
ML 31
MR 32
PLAY OUT 33
H → L
BA6109
M
ON → OFF
38 BIAS
37 REC MUTE
H → L
SOURCE 34
L → H
35
Switched to L level for about 4 seconds after REC MUTE operation.
36
H → L → H
Switched to L level from just before and up to 20ms after tape monitor is changed from TAPE to SOURCE.
INPUT
ON
OFF → ON
OFF → ON
ON → OFF
OFF → ON
OUTPUT
OFF → ON → OFF
OFF → ON → OFF

Fig. 4-25 REC MUTE operation

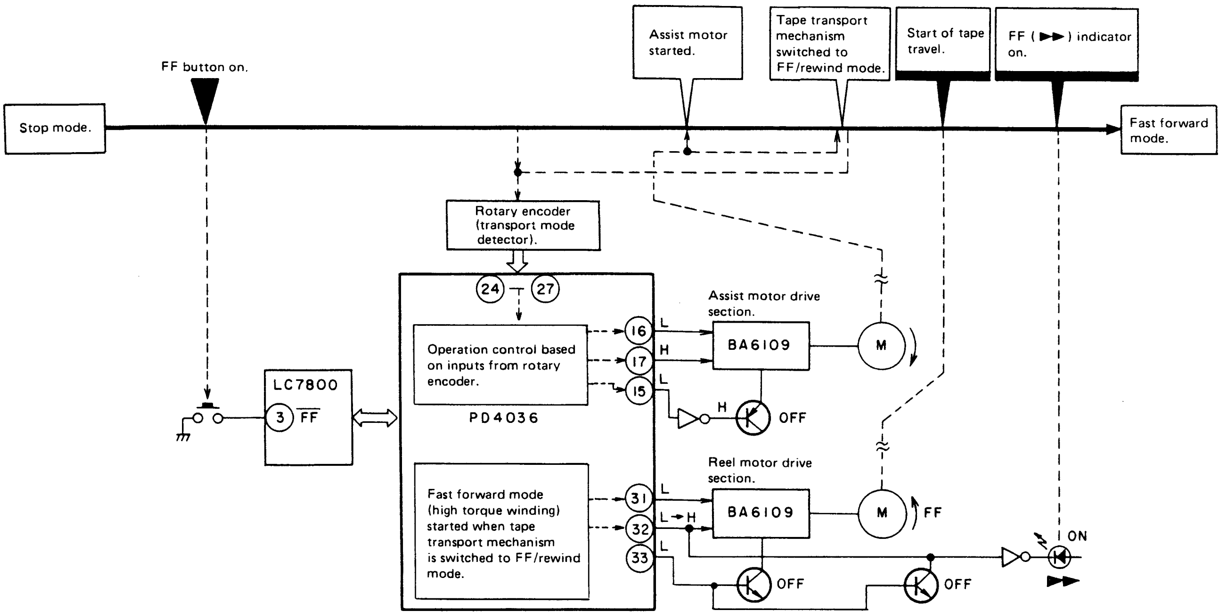

Assist motor started.
Tape transport mechanism switched to FF/rewind mode.
Start of tape travel.
FF (►►) indicator on.
FF button on.
Stop mode.
Fast forward mode.
Rotary encoder (transport mode detector).
24
27
Assist motor drive section.
16
L
17
H
15
L
BA6109
M
Operation control based on inputs from rotary encoder.
LC7800
3 FF
PD4036
H
OFF
Reel motor drive section.
Fast forward mode (high torque winding) started when tape transport mechanism is switched to FF/rewind mode.
31
L
32
L→H
33
L
BA6109
M
FF
ON
OFF
OFF
►►

Fig. 4-26 From stop to fast forward mode

Rewing Mode Operation

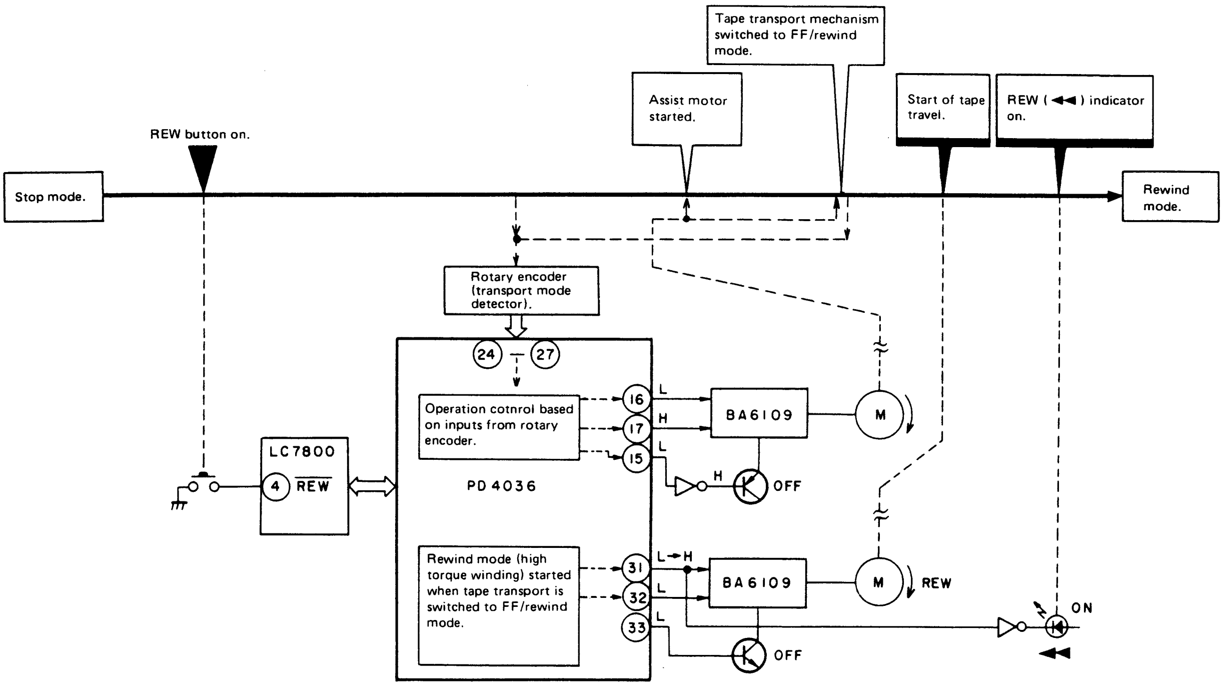

Tape transport mechanism switched to FF/rewind mode.
Assist motor started.
Start of tape travel.
REW (◄◄) indicator on.
REW button on.
Stop mode.
Rewind mode.
Rotary encoder (transport mode detector).
24
27
16
L
17
H
15
L
BA6109
M
Operation cotnrol based on inputs from rotary encoder.
LC7800
4 REW
PD 4036
H
OFF
Rewind mode (high torque winding) started when tape transport is switched to FF/rewind mode.
31
L→H
32
L
33
L
BA6109
M
REW
ON
OFF
◄◄

Fig. 4-27 From stop to rewind mode

MS Operation

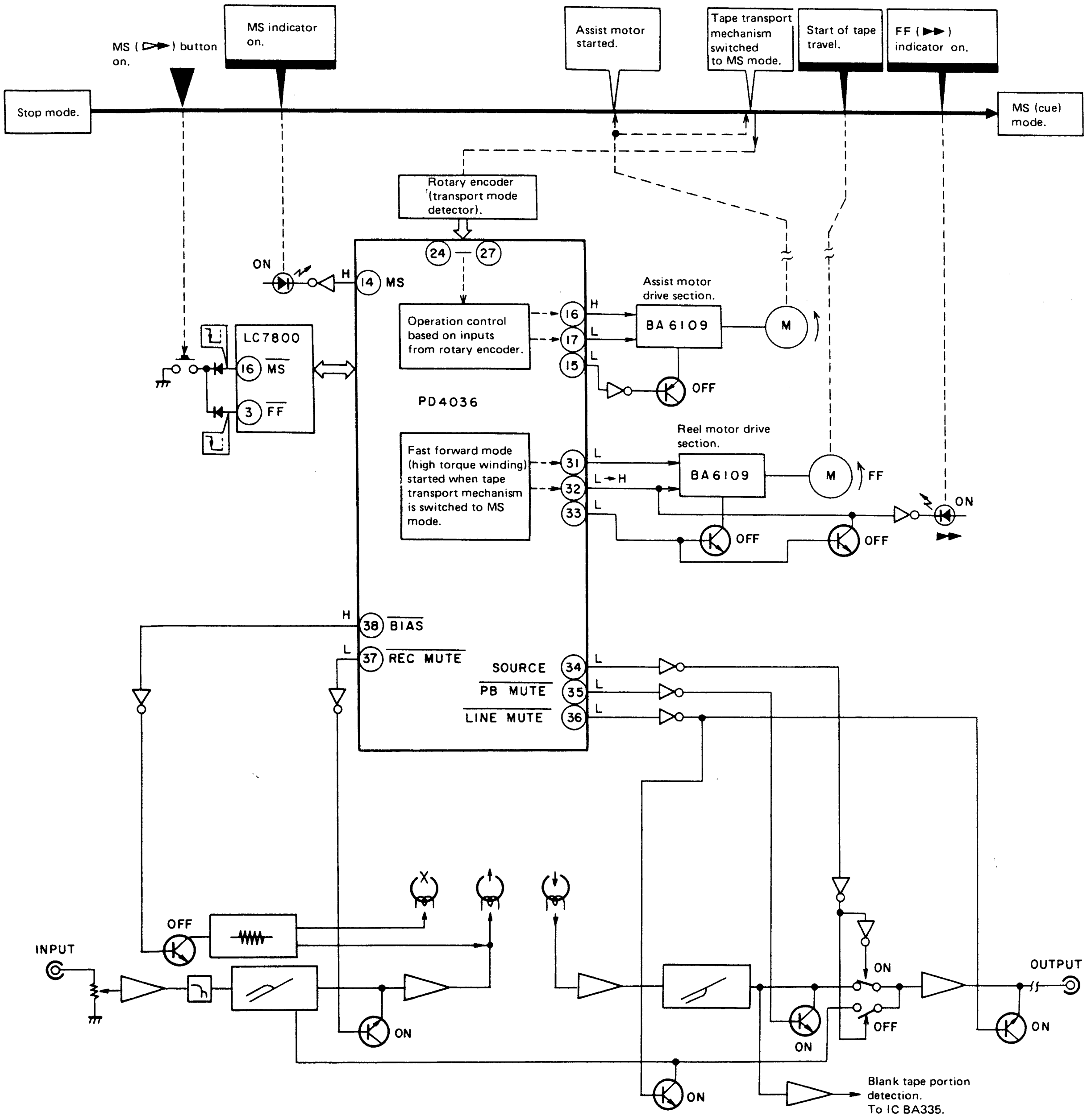

MS (▷►) button on.
MS indicator on.
Assist motor started.
Tape transport mechanism switched to MS mode.
Start of tape travel.
FF (►►) indicator on.
Stop mode.
MS (cue) mode.
Rotary encoder (transport mode detector).
24
27
ON
H
14 MS
Operation control based on inputs from rotary encoder.
16
17
15
H
L
L
Assist motor drive section.
BA6109
M
OFF
LC7800
16 MS
3 FF
PD4036
Reel motor drive section.
Fast forward mode (high torque winding) started when tape transport mechanism is switched to MS mode.
31
32
33
L
L→H
L
BA6109
M
FF
ON
OFF
OFF
►►
H
38 BIAS
L
37 REC MUTE
SOURCE 34
PB MUTE 35
LINE MUTE 36
L
L
L
OFF
INPUT
ON
ON
ON
ON
OFF
OUTPUT
ON
Blank tape portion detection. To IC BA335.

Fig. 4-28 From stop to cue mode

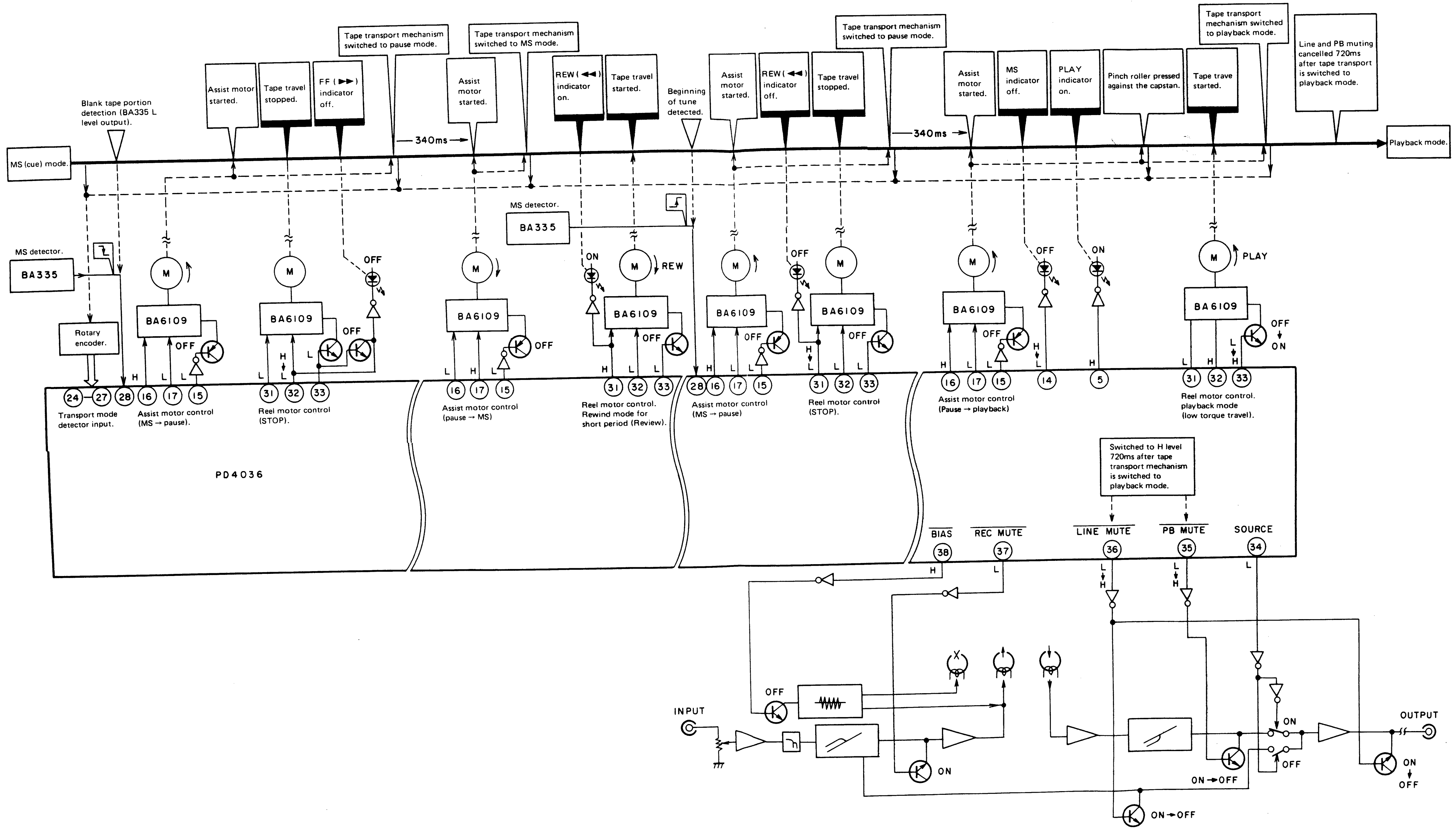
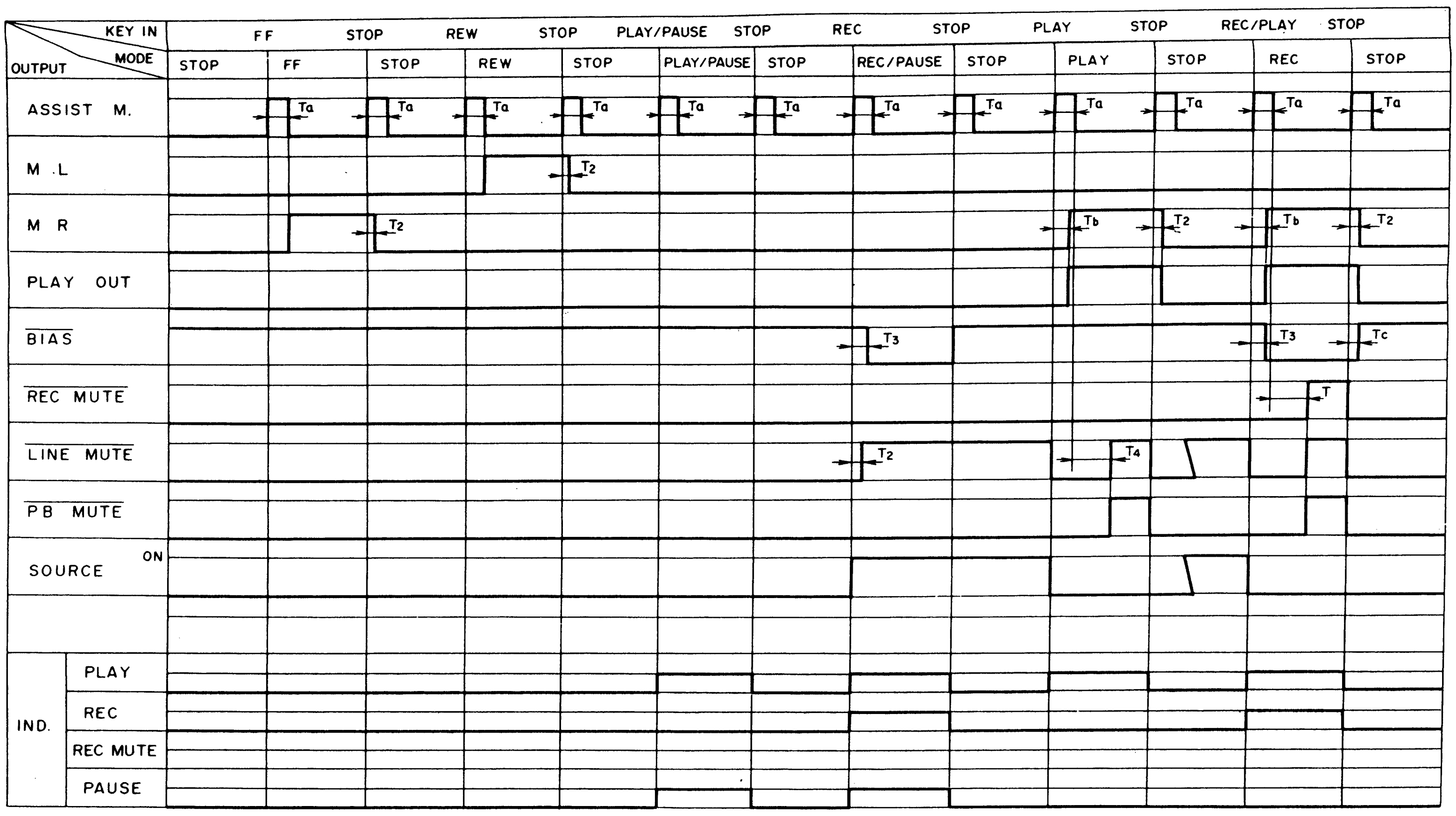

MS (cue) mode.
Blank tape portion detection (BA335 L level output).
Assist motor started.
Tape travel stopped.
FF (►►) indicator off.
Tape transport mechanism switched to pause mode.
340ms
Assist motor started.
Tape transport mechanism switched to MS mode.
REW (◄◄) indicator on.
Tape travel started.
Beginning of tune detected.
Assist motor started.
REW (◄◄) indicator off.
Tape travel stopped.
Tape transport mechanism switched to pause mode.
340ms
Assist motor started.
MS indicator off.
PLAY indicator on.
Pinch roller pressed against the capstan.
Tape transport mechanism switched to playback mode.
Tape trave started.
Line and PB muting cancelled 720ms after tape transport is switched to playback mode.
Playback mode.
MS detector.
BA335
Rotary encoder.
BA6109
M
REW
PLAY
OFF
ON
H
L
24
27
28
16
17
15
31
32
33
14
5
Transport mode detector input.
Assist motor control (MS → pause).
Reel motor control (STOP).
Assist motor control (pause → MS)
Reel motor control. Rewind mode for short period (Review).
Assist motor control (MS → pause)
Reel motor control (STOP).
Assist motor control (Pause → playback)
Reel motor control. playback mode (low torque travel).
PD4036
Switched to H level 720ms after tape transport mechanism is switched to playback mode.
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
38
37
36
35
34
INPUT
OUTPUT
ON → OFF
ON
OFF

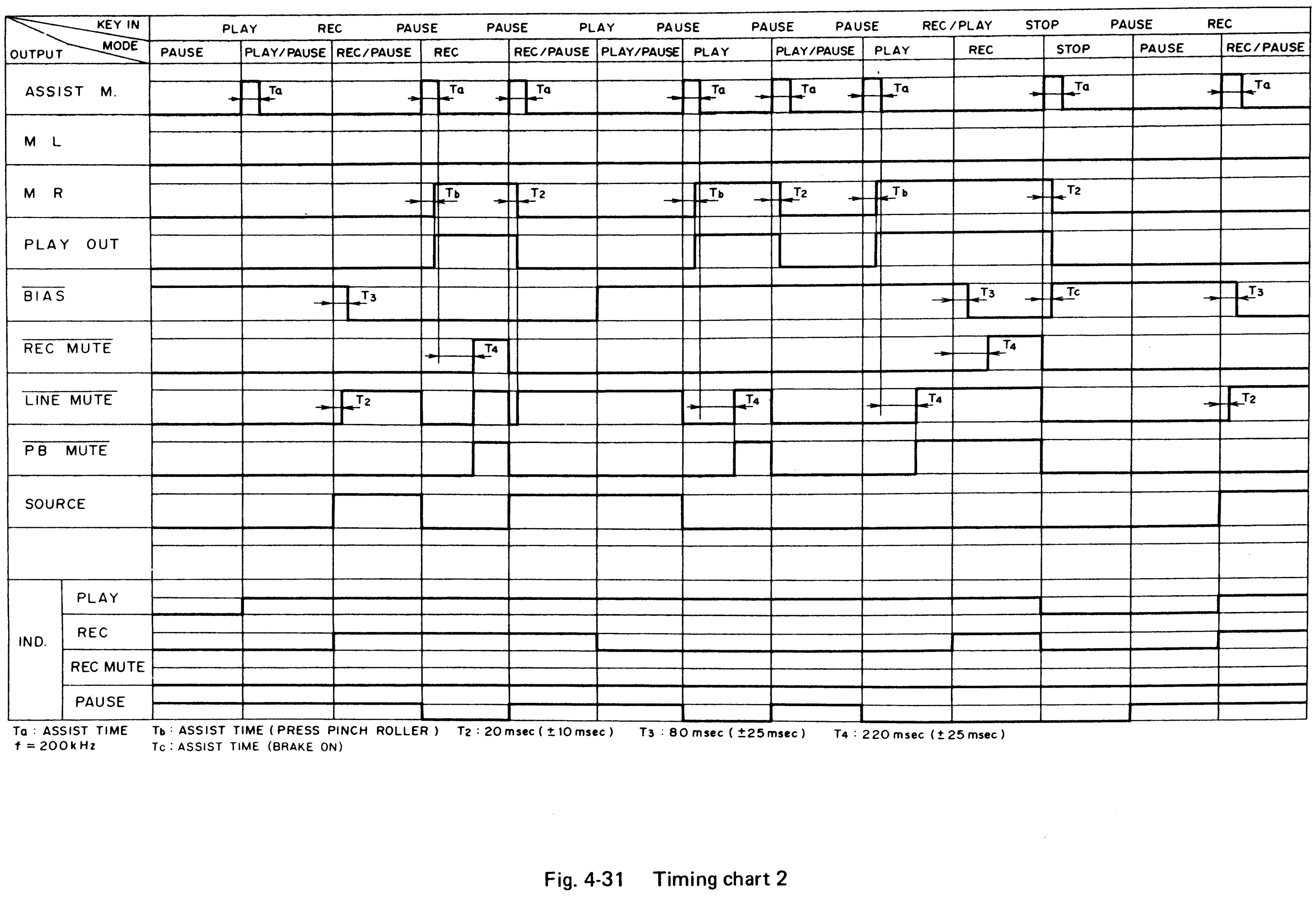
Fig. 4-29 From cue to playback mode

4.7 MECHANISM CONTROL TIMING CHART


KEY IN
MODE
OUTPUT
FF STOP REW STOP PLAY/PAUSE STOP REC STOP PLAY STOP REC/PLAY STOP
STOP FF STOP REW STOP PLAY/PAUSE STOP REC/PAUSE STOP PLAY STOP REC STOP
ASSIST M.
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
Tc
T2
T3
T4
T

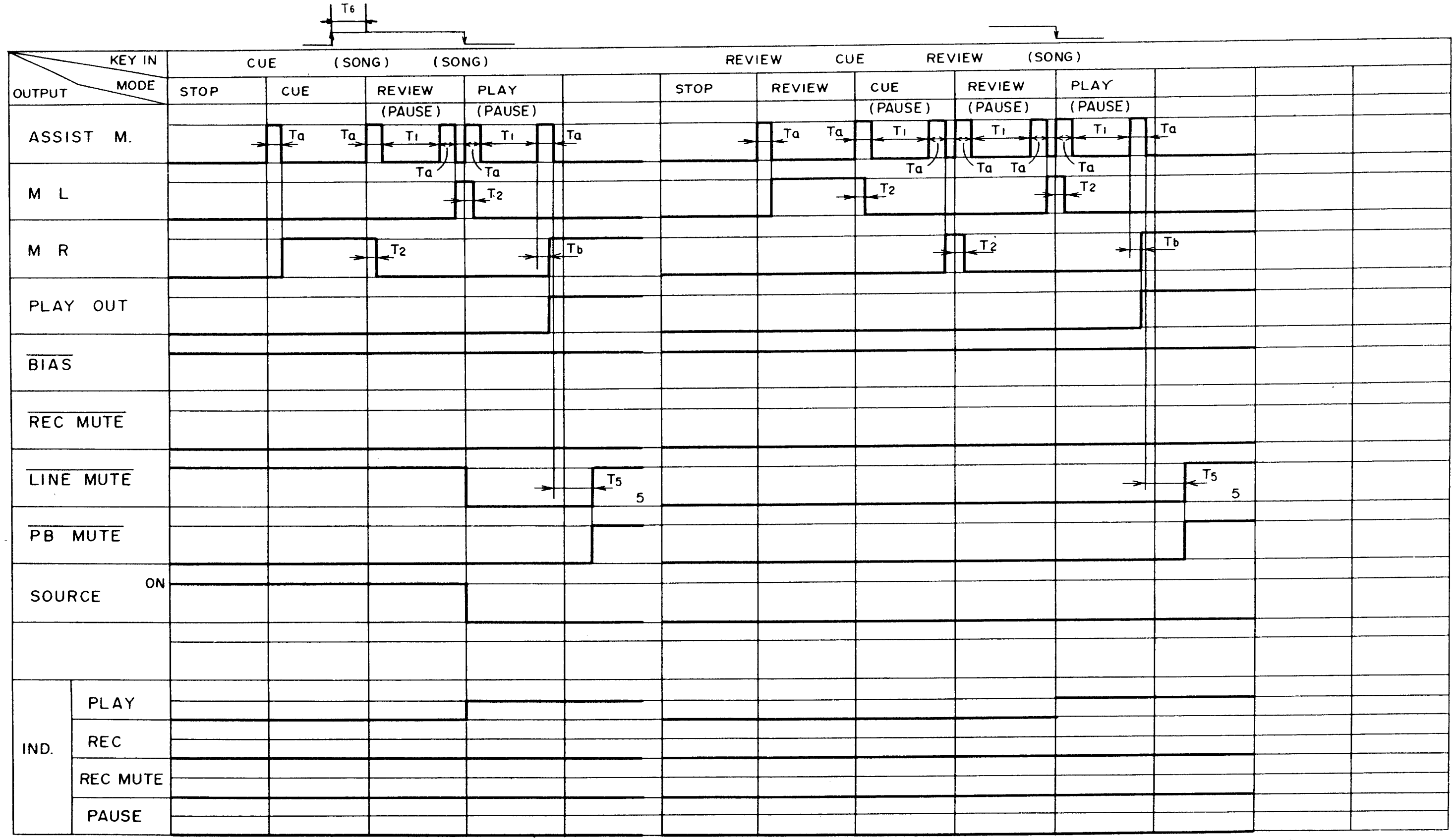
Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) T2 : 20 msec (±10 msec) T3 : 80 msec (±25 msec) T4 : 220 msec (±25 msec)
f = 200kHz Tc : ASSIST TIME (BRAKE ON)

Fig. 4-30 Timing chart 1


KEY IN
MODE
OUTPUT
PLAY REC PAUSE PAUSE PLAY PAUSE PAUSE PAUSE REC/PLAY STOP PAUSE REC
PAUSE PLAY/PAUSE REC/PAUSE REC REC/PAUSE PLAY/PAUSE PLAY PLAY/PAUSE PLAY REC STOP PAUSE REC/PAUSE
ASSIST M.
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
Tc
T2
T3
T4

Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) T2 : 20 msec (±10 msec) T3 : 80 msec (±25 msec) T4 : 220 msec (±25 msec)
f = 200kHz Tc : ASSIST TIME (BRAKE ON)

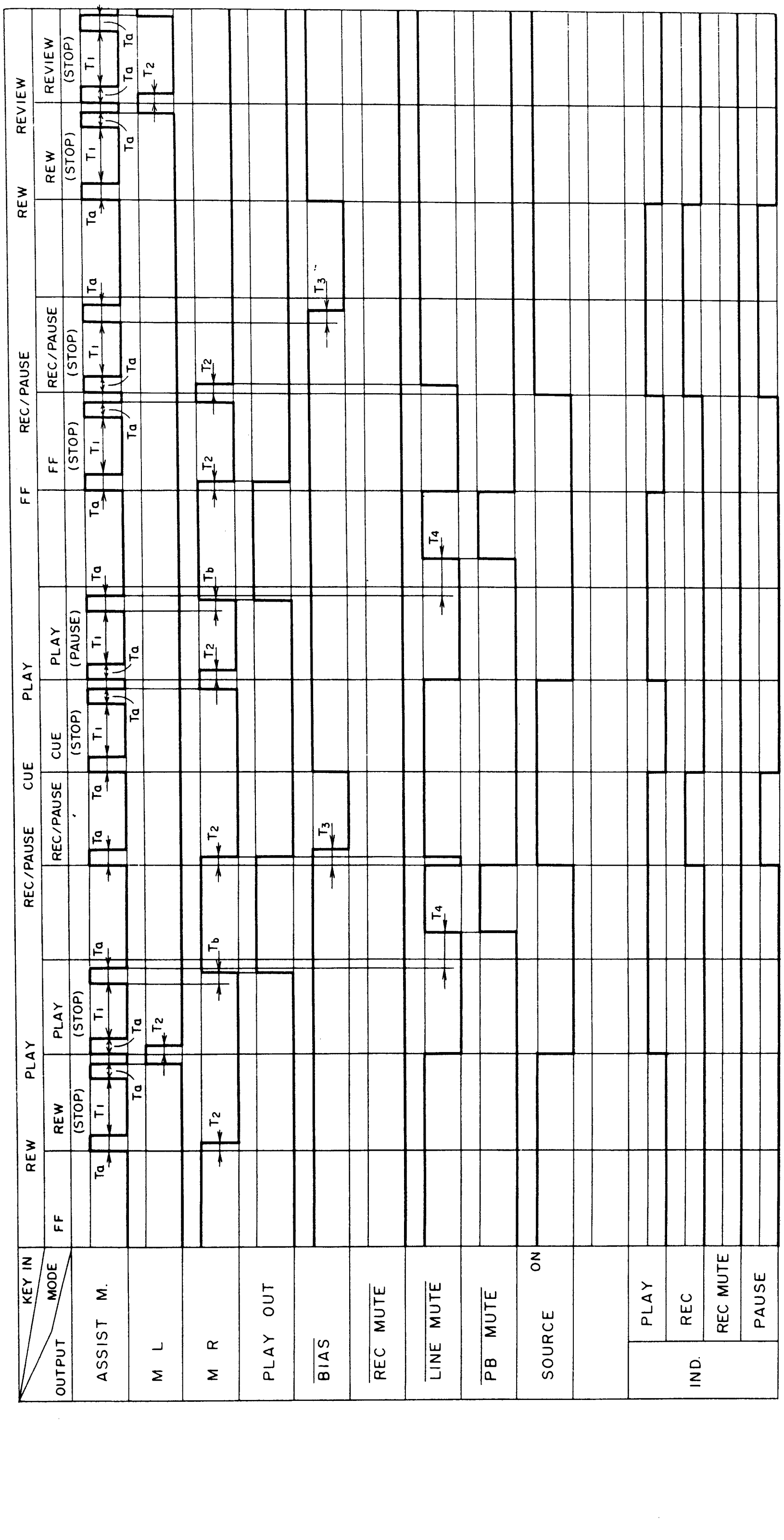
Fig. 4-31 Timing chart 2


KEY IN
MODE
OUTPUT
CUE
(SONG)
(SONG)
REVIEW
CUE
REVIEW
(SONG)
STOP
CUE
REVIEW (PAUSE)
PLAY (PAUSE)
STOP
REVIEW
CUE (PAUSE)
REVIEW (PAUSE)
PLAY (PAUSE)
T6
ASSIST M.
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
T1
T2
Tb
T5
5

Ta : ASSIST TIME
f = 200 kHz

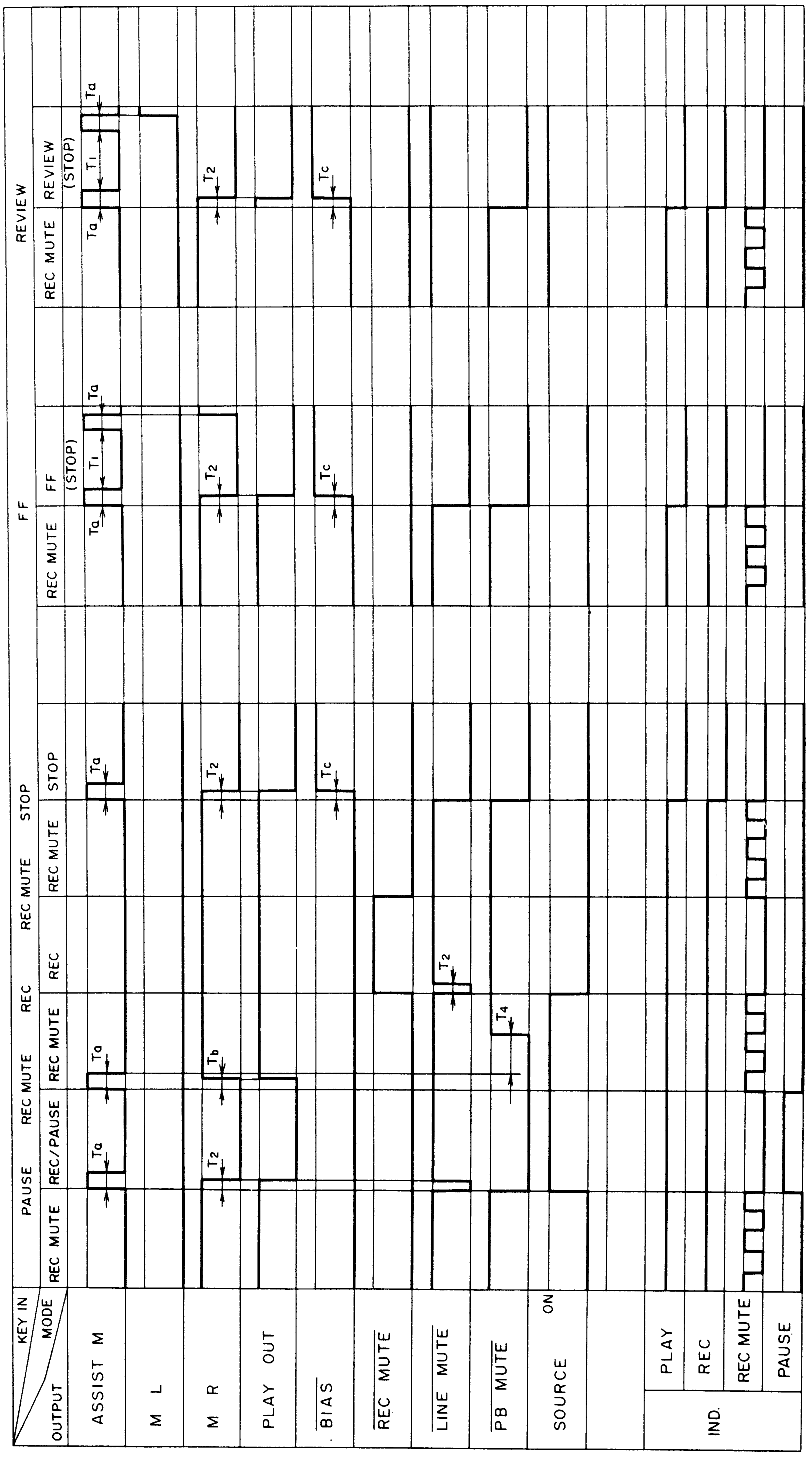
Tb : ASSIST TIME (PRESS PINCH ROLLER) T1 : 340 msec (± 25 msec) T2 : 20 msec (± 10 msec) T5 : 720 msec (± 25 msec) T6 : 200msec (± 25msec)

Fig. 4-32 Timing chart 3


KEY IN
MODE
OUTPUT
FF
REW
PLAY
REC/PAUSE
CUE
PLAY
FF
REC/PAUSE
REW
REVIEW
REW (STOP)
PLAY (STOP)
REC/PAUSE
CUE (STOP)
PLAY (PAUSE)
FF (STOP)
REC/PAUSE (STOP)
REW (STOP)
REVIEW (STOP)
ASSIST M.
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
T1
T2
T3
T4

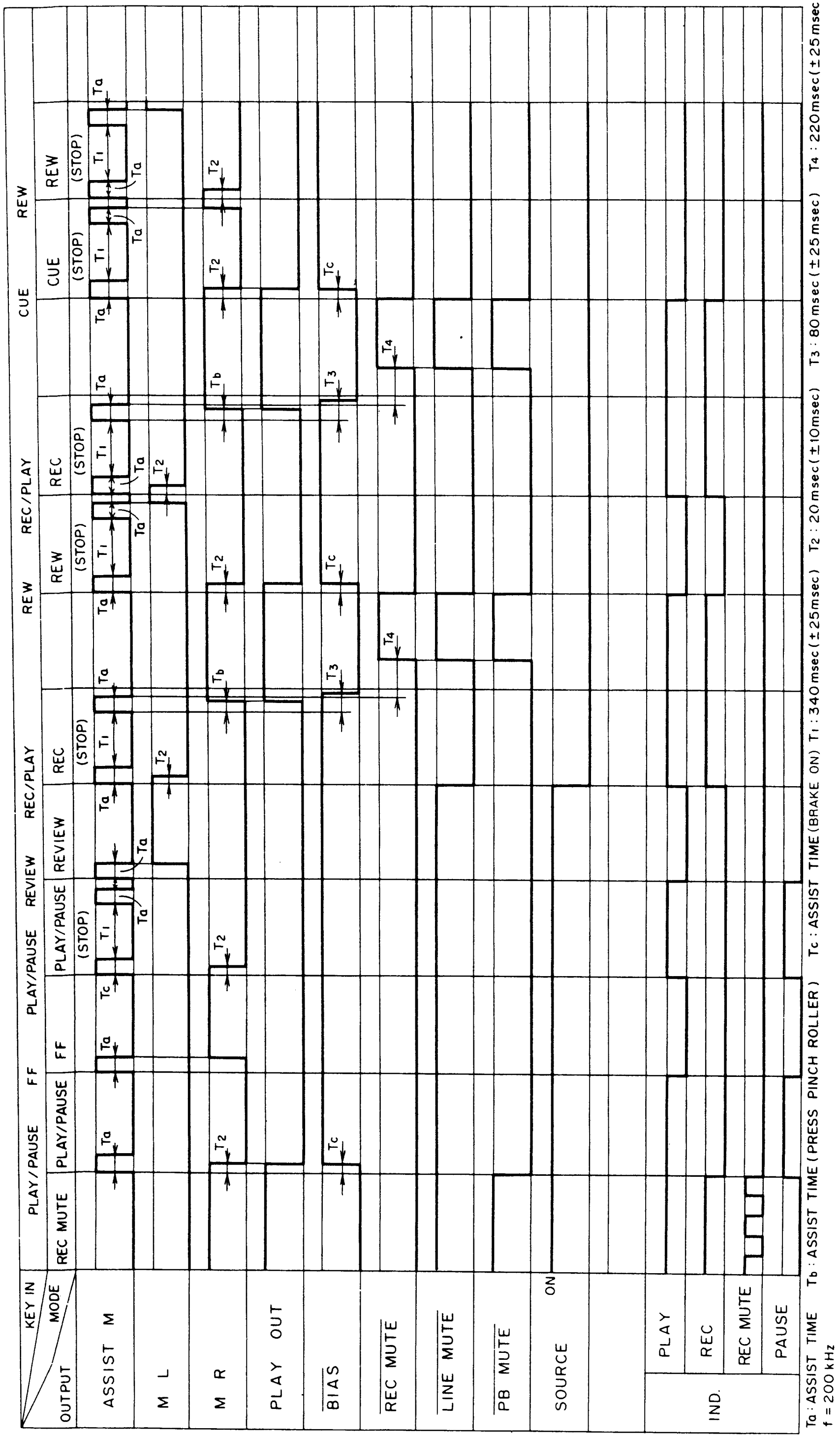
Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) T1 : 340 msec (±25 msec) T2 : 20 msec (±10 msec) T3 : 80 msec (±25 msec) T4 : 220 msec (±25 msec)
f = 200 kHz

Fig. 4-33 Timing chart 4


KEY IN
MODE
OUTPUT
PAUSE
REC MUTE
REC
REC MUTE
STOP
FF
REVIEW
REC MUTE
REC/PAUSE
REC MUTE
REC
REC MUTE
STOP
REC MUTE
FF
(STOP)
REC MUTE
REVIEW
(STOP)
ASSIST M
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
Tc
T1
T2
T4

Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) Tc : ASSIST TIME (BRAKE ON) T_1 : 340 msec (± 25 msec) T_2 : 20 msec (± 10 msec) T_4 : 220 msec (± 25 msec)
f = 200 kHz

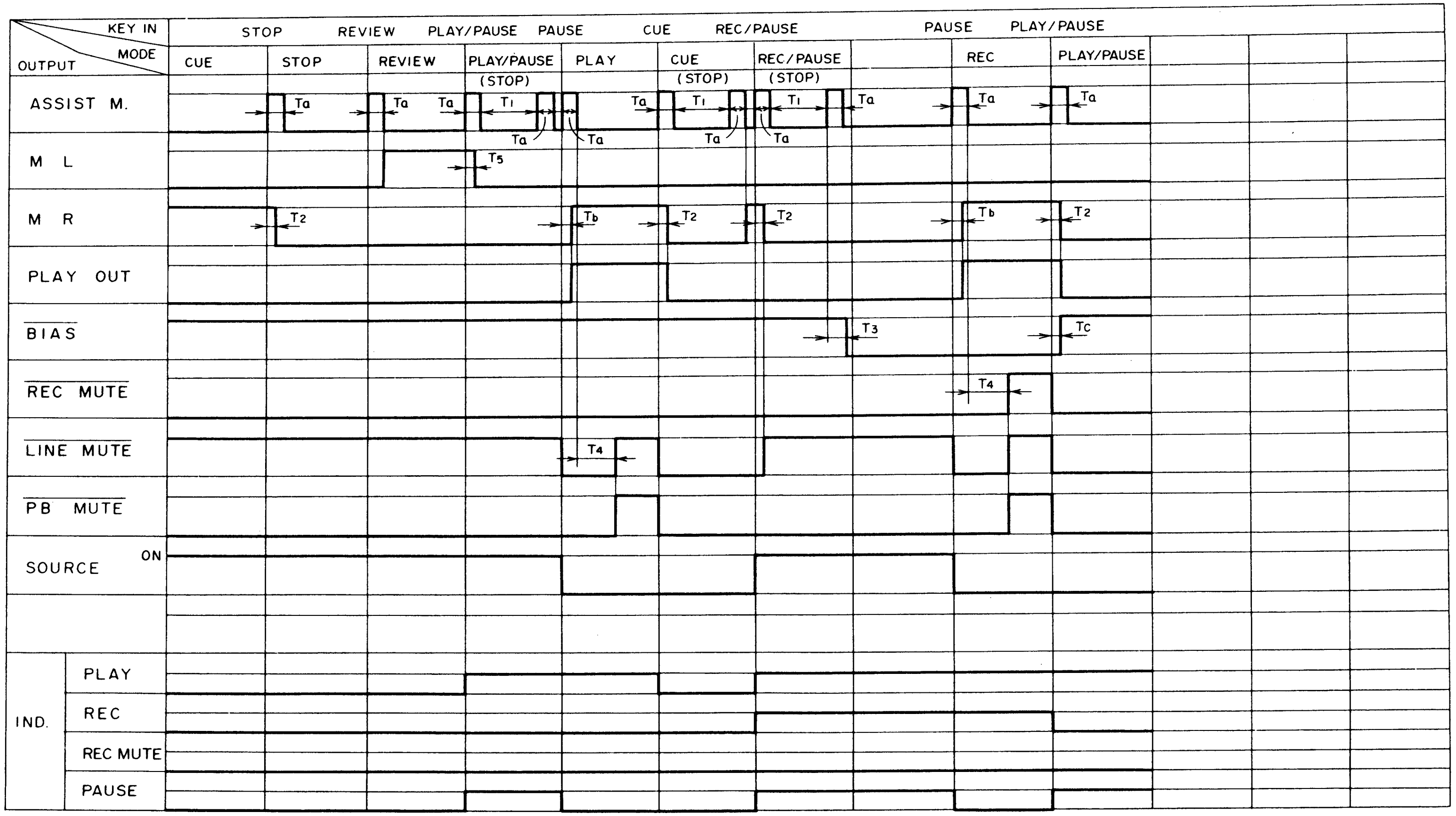
Fig. 4-34 Timing chart 5


KEY IN
MODE
OUTPUT
REC MUTE
PLAY/PAUSE
PLAY/PAUSE
FF
FF
PLAY/PAUSE
PLAY/PAUSE (STOP)
REVIEW
REVIEW
REC/PLAY
REC (STOP)
REW
REW (STOP)
REC/PLAY
REC (STOP)
CUE
CUE (STOP)
REW
REW (STOP)
ASSIST M
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
Tc
T1
T2
T3
T4

Ta : ASSIST TIME
f = 200 kHz

Tb : ASSIST TIME (PRESS PINCH ROLLER) Tc : ASSIST TIME (BRAKE ON) T1 : 340 msec (±25 msec) T2 : 20 msec (±10 msec) T3 : 80 msec (±25 msec) T4 : 220 msec (±25 msec)

Fig. 4-35 Timing chart 6


KEY IN
MODE
OUTPUT
STOP
REVIEW
PLAY/PAUSE
PAUSE
CUE
REC/PAUSE
PAUSE
PLAY/PAUSE
CUE
STOP
REVIEW
PLAY/PAUSE (STOP)
PLAY
CUE (STOP)
REC/PAUSE (STOP)
REC
PLAY/PAUSE
ASSIST M.
M L
M R
PLAY OUT
BIAS
REC MUTE
LINE MUTE
PB MUTE
SOURCE
ON
IND.
PLAY
REC
REC MUTE
PAUSE
Ta
Tb
Tc
T1
T2
T3
T4
T5

Ta : ASSIST TIME　Tb : ASSIST TIME (PRESS PINCH ROLLER)　Tc : ASSIST TIME (BRAKE ON)　T1 : 340msec(±25msec)　T2 : 20msec(±10msec)　T3 : 80msec(±25msec)　T4 : 220msec(±25msec)
f = 200kHz

Fig. 4-36　Timing chart 7